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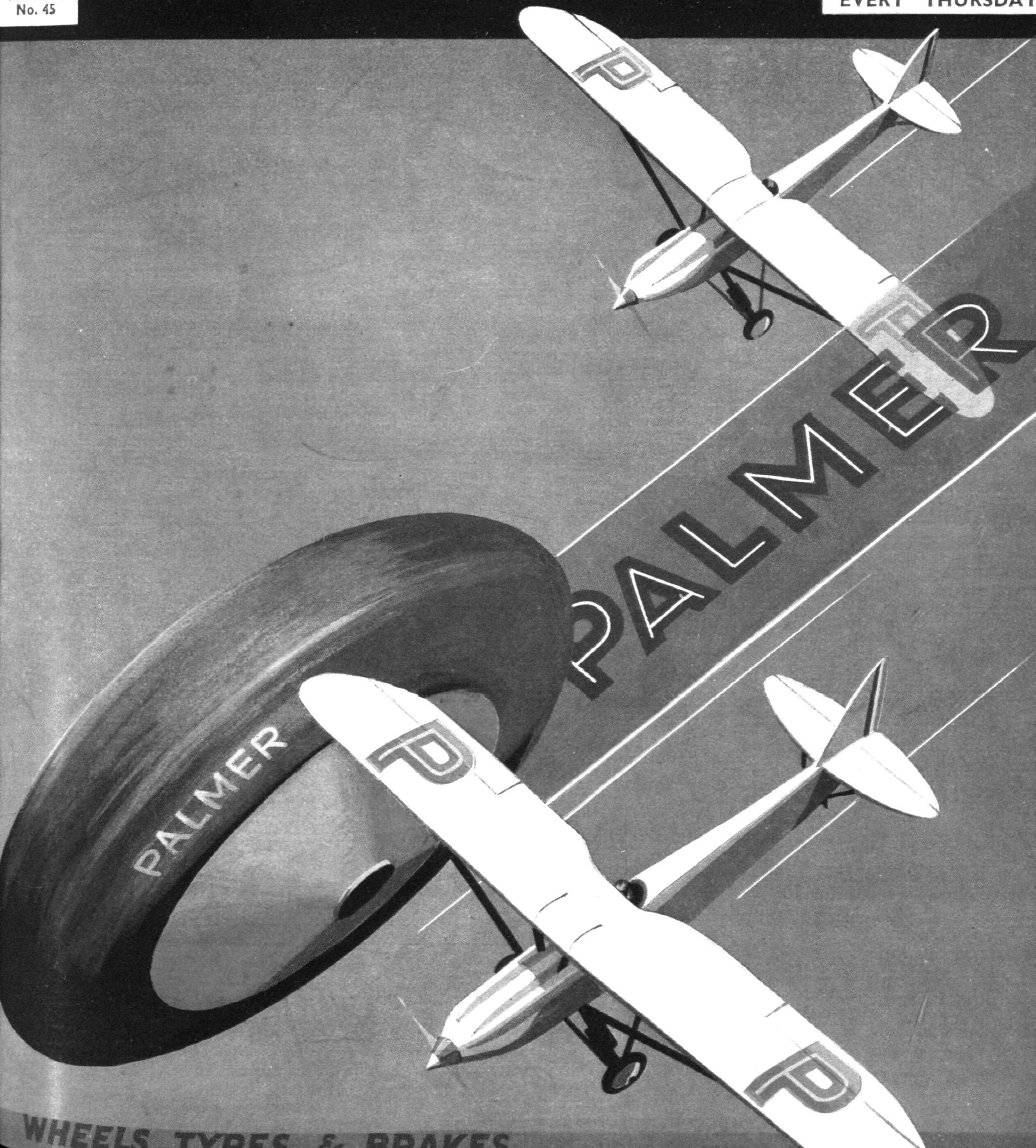
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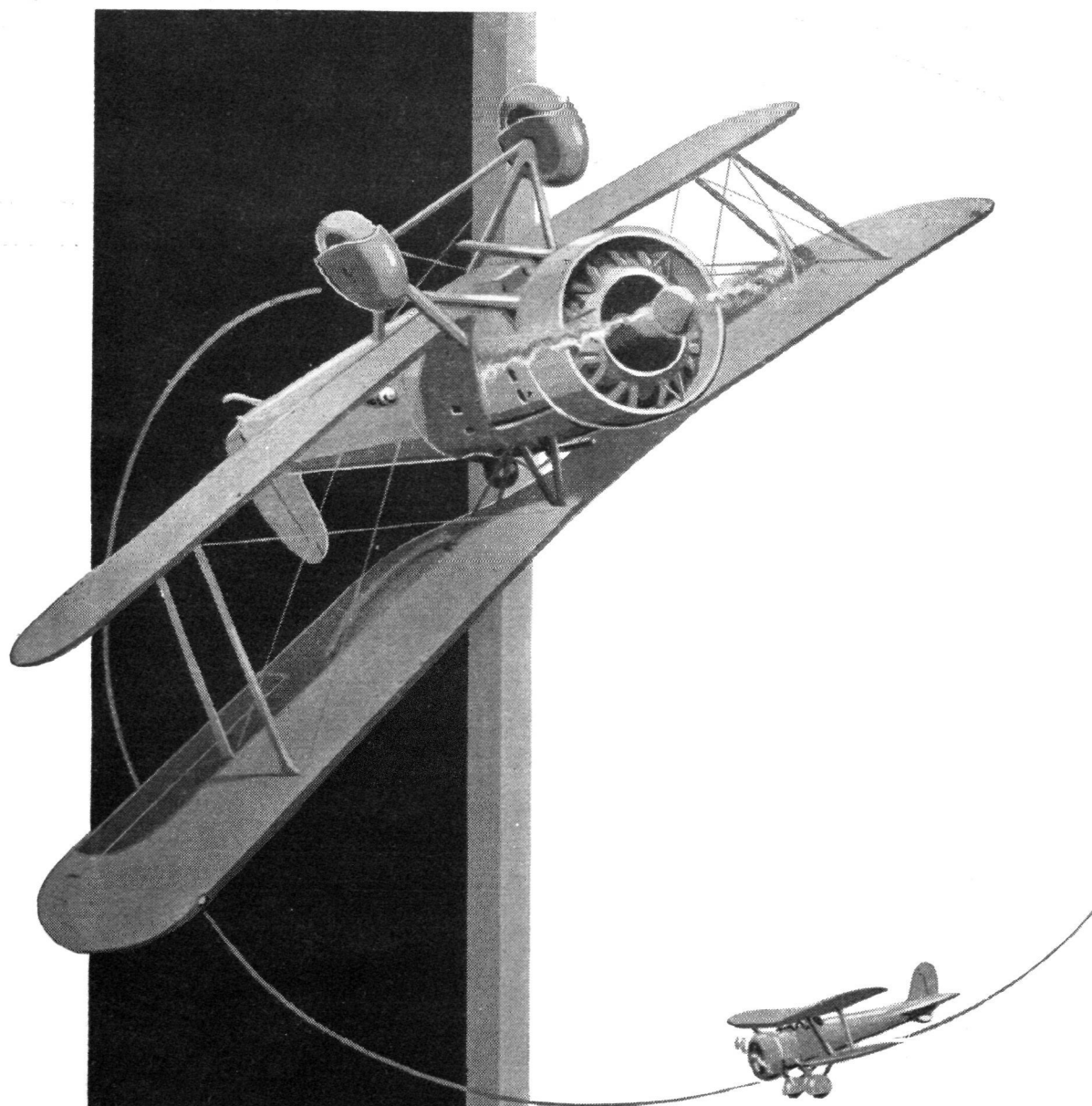
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No. 1298
Vol. XXV
No. 45



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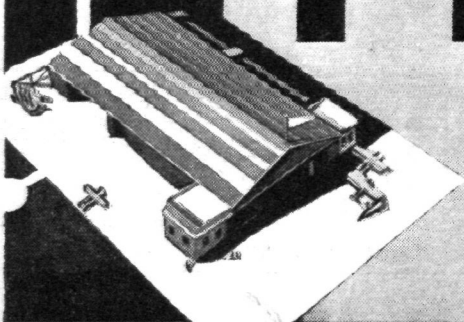
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Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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EDITORIAL COMMENT



"CYCLOGIRO" is the name given by the American National Advisory Committee for Aeronautics to a type of aircraft in which the lifting surfaces are placed with their spans at right-angles to the line of flight, while following a circular flight path when the machine has no translational velocity (*i.e.*, is stationary), but follow a cycloidal path when the aircraft, as a whole, is moving in any direction. We referred to the Rohrbach Rotating Wing (Conclusion) in these columns, and also published last week "Autogiro" or "Paddle Plane" in these columns, and also published last week "Cyclogiro"? the first instalment of an article by Mr. W. S. Shackleton on this machine. In this week's issue Mr. Shackleton concludes his article. The fact that elsewhere in FLIGHT we publish this week some photographs and notes on the latest Cierva Autogiro, which will be known as the C.30 P and is the first of the production models, must inevitably cause the serious student of aeronautics to ask himself which of the two types should be regarded as the aircraft of the future?

The theory of both the autogiro and the cyclogiro is so complicated that few people in any country are qualified to express an opinion on the theoretical merits of the two types. Mr. de la Cierva has been working on the autogiro for very many years, and not until now has he evolved a type which meets the needs of the ordinary owner to his satisfaction. One may, therefore, well ask how long it is likely to take to bring the cyclogiro to a similar stage of perfection, quite apart from any relative merits of the aerodynamic features.

The new C.30 P autogiro is a perfectly amazing aircraft. It takes off with almost no run, and lands without any run at all. Its climbing angle is good, it will remain in the air at speeds certainly as low as 20 m.p.h., and its cruising speed is probably well above 100 m.p.h. One could not really ask very much more from any aircraft. It will not, of course, hover stationary over the ground in a flat calm, nor will it rise quite vertically unless there is a fairly strong wind blowing. But it may well be argued

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1933.

- Nov. 15. Entries close for 1934 International Touring Competition, Poland.
- Nov. 16. Herts and Essex Ae.C. Annual Dinner and Dance, Wharnclyffe Rooms, Hotel Gt. Central, London.
- Nov. 16. "Stiffness of Aeroplane Wings." Lecture by H. Roxbee Cox before R.Ae.S.
- Nov. 16. Lord Wakefield Boxing Competition, R.A.F., Henlow.
- Nov. 21. No. 605 County of Warwick Sqdn., A.A.F., Dance at Castle Bromwich Aerodrome.
- Nov. 24. Central Flying School "Coming of Age" Dinner, at May Fair Hotel.
- Nov. 24. Yorkshire Ae.C. Annual Dance, Hotel Majestic, Harrogate.
- Nov. 25. Comrades of the R.A.F. Reunion Dinner, at Thames House Restaurant, Millbank, S.W.1.
- Nov. 30. "Tail Buffeting." Lecture by Dr. W. J. Duncan before R.Ae.S.
- Dec. 1. No. 3 Sqdn. R.F.C. and R.A.F. Reunion Dinner, at May Fair Hotel.
- Dec. 1. No. 70 Sqdn., R.A.F., Reunion Dinner, at R.A.F. Club, Piccadilly.
- Dec. 1. Martlesham Annual Dinner.
- Dec. 1. Lancashire Ae.C. Annual Ball, Midland Hotel, Manchester.
- Dec. 1. Hampshire Ae.C. Annual Dinner and Dance, South Western Hotel, Southampton.
- Dec. 1. Leicestershire Ae.C. Dance, at Palais de Danse, Leicester.
- Dec. 6. A.I.D. Approved Inspectors' Dinner, at R.I. Victoria Hotel, Sheffield.
- Dec. 7. "Possible Future Development of Aircraft Engines." Lecture by A. H. R. Fedden before R.Ae.S.
- Dec. 8. Calshot Reunion Dinner, at R.A.F. Club, Piccadilly, W.1.

that in nine cases out of ten there is no need for vertical ascent or descent. For one thing, there is nearly always a little wind, and the autogiro requires very little to change its ascents and descents into as nearly vertical paths as makes no practical difference. From an efficiency point of view, it is now becoming clear that the autogiro is by no means inferior to the average aeroplane, as its cruising speed, with the 7-cylinder "Genet Major" engine, is somewhere very close to that of aeroplanes of comparable size fitted with the same engine. The direct-control rotor has undergone a period of development and is now reported to be as "light on the stick" as any aeroplane. Thus it can now be said that the autogiro is a really practical craft, and has left its teething troubles behind. Initial cost and maintenance are now the only obstacles to popularising the type.

If we turn to the cyclogiro type of rotating wing aircraft, it is found that experts in several countries agree that the aerodynamic aspects are sound enough. In his article this week Mr. Shackleton quotes from an American N.A.C.A. Technical Note a sentence dealing with this. The same report, however, also contains the following sentences: "It should be pointed out, however, that serious structural difficulties will attend the practical application of these principles. The control system will be necessarily complicated mechanically, and gyroscopic couples in the rotor will add complexities." Apparently the N.A.C.A. considers that these difficulties are not insuperable, for it concludes: "The system possesses sufficient promise, nevertheless, to justify further work, and it is recommended that this theoretical study be supplemented by experiment."

The American report outlines a simplified theory of the cyclogiro, and use is then made of this theory to work out the performance of a complete machine with certain assumed dimensions and characteristics. It is estimated that a machine weighing 3,000 lb. should have a maximum speed of about 100 m.p.h. if fitted with an engine of 300 h.p. The minimum power required is about 142 b.h.p. at 45 m.p.h. The most striking thing about the machine is, however, its rate of climb. If the ascent is to be vertical, the rate of climb is not unusually high, but if a flight path angle of 30 deg. with the horizontal is permissible the rate of climb goes up to about 1,500 ft./min. For a machine carrying 10 lb./h.p. this is, of course, a very remarkable rate of climb.

In the American report the drag has been conservatively estimated, so that probably the actual performance might be better than predicted. It would seem, however, that there is a considerable gap between the 100 m.p.h. or so predicted by the American authorities for a 3,000-lb. machine of 300 h.p. and the speed estimated by Dr. Rohrbach for his machine. As the cyclogiro theory is still in its infancy, it would be well not to place too much reliance upon predicted performances. The one is just as likely to be over-estimated as the other is to be under-estimated, and superficially at least there is no reason to believe that one system is vastly superior to the other from an aerodynamic point of view. To us it seems that the main battle will be fought out on mechanical grounds, and it is still too early to say which offers the better solution. So

far Mr. de la Cierva is well ahead in that he has his experimental period over as far as his main problems are concerned.

❖ ❖ ❖ ❖

With three new types of flying boat about to be issued as Service equipment, thoughts naturally turn very much to our flying boat squadrons. No. 209 F.B. Squadron, now at Mount Batten, is to receive four Blackburn "Perths," and will take them out to Malta, where the squadron is relieving No. 202 F.B. Squadron. No. 210 F.B. Squadron, stationed at Pembroke Dock, has, since its formation, carried on its work with the "Southamptons" sent home from Basra, when No. 203 F.B. Squadron out there received its "Rangoons." No. 210 is now to be re-equipped with the Short "Singapore 3" with four Rolls-Royce "Kestrel" engines. There remain in Home waters No. 204 F.B. Squadron at Mount Batten and No. 201 F.B. Squadron at Calshot, both now equipped with the "Southampton." In addition, No. 202 F.B. Squadron will soon be home from Malta, flying their Fairey III F float-planes, for though they have always been designated a flying boat squadron they have for years been obliged to work with float-planes as "temporary" equipment. They certainly deserve now to get boats.

The third new type to be adopted is the Supermarine "Scapa" (a very happy name), which is driven by two Rolls-Royce "Kestrels," and which, as recorded elsewhere in FLIGHT this week, has already made some very fine test flights in the Mediterranean. A boat which can fly non-stop between Gibraltar and Malta has long been one of our ambitions, and the "Scapa" has covered this route twice. It remains to be seen which squadron or squadrons will be honoured by being selected to receive the "Scapa." From one point of view it would seem that the squadron from Malta, No. 202, deserves the honour, as it has for so long been without any boats at all, but authorities may take the view that as any boats will be better than no boats, No. 202 will be quite pleased and happy if they are given some of the "Southamptons" taken from other squadrons. Moreover, it would be a great convenience from the point of view of spares, etc., if Mount Batten became for a time a station for two squadrons of "Southamptons." No. 204 is there already and has that type. No. 202, on its return from Malta, will probably go to Mount Batten in place of No. 209, which will have relieved it at Malta. Therefore let No. 202 have "Southamptons" also. If that argument were to prevail, it would follow that the first squadron to get the "Scapa" would be No. 201 at Calshot.

So much for Home waters. Overseas stations must not be forgotten. Singapore is a vital spot in Empire defence. It will shortly have an air force of two torpedo-bomber squadrons and one flying boat squadron. The latter is No. 205 F.B. Squadron, and it also has time-honoured "Southamptons." At Basra in the Persian Gulf is No. 203 F.B. Squadron, with the now rather antiquated "Rangoon." Both these squadrons deserve new equipment.

And, finally, now that satisfactory new types have been selected, why should we not have some more flying boat squadrons? We certainly need them.

ALLEZ OOP! The new C.30 P Autogiro leaps off the ground almost like a circus horse, and no doubt the extra power of the 7-cylinder "Genet Major" engine has a lot to do with this. Mr. H. A. Marsh, test pilot to the Autogiro Co., is an adept at demonstration, and in this case showed conclusively that this latest Autogiro has a far better take-off than the majority of other aircraft. Access to the passengers' cockpit is much better in this model, the side of the fuselage by the front cockpit having been made like a roll-top desk so that it can readily be lowered. See next page.

(FLIGHT Photo.)





A NEW AUTOGIRO

WE recently had the opportunity of being present at a demonstration of the latest product of the Cierva Autogiro Co., Ltd. This machine is the C.30P., which, in its essentials, is the production version of the C.30, that is, the wingless direct-controlled type, but now has the seven-cylinder 140-h.p. Armstrong Siddeley "Genet Major" engine instead of the 105-h.p. five-cylinder "Genet Major." It was naturally expected that the increased power would put up the performance considerably, but we were not prepared for such a large increase as is apparent to those who have followed the "Autogiro" through the various stages of its development. It is not yet possible to publish the performance figures of this new type, and will not be so until an exhaustive series of tests have been carried out with it. As far as can be ascertained, the top speed is in excess of that obtained on the majority of light aeroplanes, powered with this engine; the cruising speed, therefore, should be very comfortably over 100 m.p.h. Señor de la Cierva tells us that the minimum flying speed in still air is between 12 and 15 miles an hour, and his statement was borne out the day we saw the machine flying at Hanworth, as in a wind of about 8 to 10 m.p.h. the pilot was flying across the aerodrome, only a few feet above the ground, at what was very little more than a comfortable trotting speed. Under these conditions his landings were to all intents and purposes vertical, while his take-off was equally astounding. We understand that when there is even only a light breeze it is possible to get clear of the ground in about 5 yards. An outstanding feature of this new model is its stability. In conversation with Mr. J. Ray, the test pilot for the Autogiro interests in America, who is over here with Mr. H. S. Pitcairn, we learned that he had, on his first flight a few days ago, been able to trim the



Left to right : Señor de la Cierva. Mr. H. S. Pitcairn, President, and Mr. J. Ray, Vice-President, of the Autogiro Co. of America. Mr. Ray is also Chief Test Pilot for the American interests. (FLIGHT Photo.)

machine so exactly that, although the weather was very bumpy, he flew for over 10 miles without touching the control column at all. This, the first model P, was, as we have already announced, built by Airwork, Ltd., at Heston, and three more of the type are under construction in the shops of A. V. Roe & Co., Ltd., at Manchester



This photograph and that at the top of the page show the essential features of the Autogiro C.30 P. The front view shows how the Townend ring, round the 7-cylinder "Genet Major" engine, cleans up the design and accounts, no doubt, very largely for the increased performance of this type. See also previous page. (FLIGHT Photos.)



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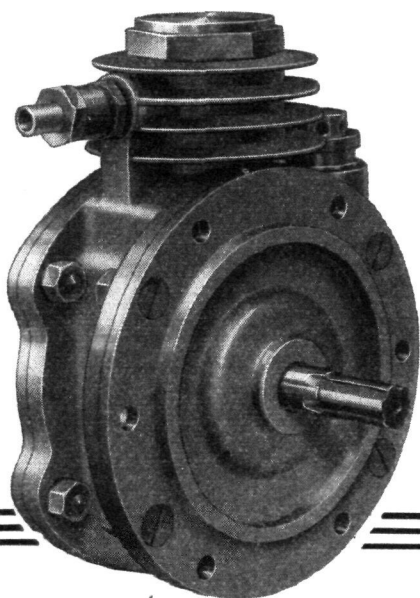
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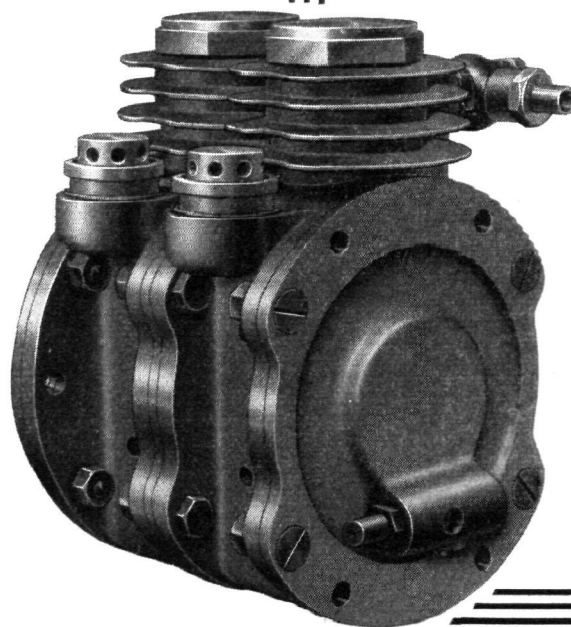
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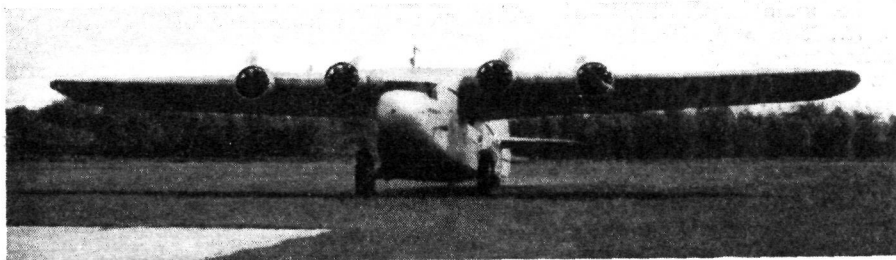
Air Transport

THE LOG OF THE "ASTRAEA"

Australia to England by Air with Imperial Airways

By HUDSON FYSH (The Managing Director of Qantas, Ltd.)

Descriptions of flights over beautiful country have often been published, but it is seldom that an article gives one a clear idea of an air journey, mentioning all the important travel points as well as giving a vivid description of the countries traversed. Perhaps the reason for this is that such articles have rarely been written by the managing director of an operating air line. Mr. Hudson Fysh, the Managing Director of Qantas, recently flew from Australia to Karachi with Major Brackley in the Armstrong-Whitworth "Astraea," and on from Karachi by regular Imperial Airways service. He has written the following log of his journey, for which we are indebted to the Secretary of the Qantas company. We take the liberty of reproducing it as we consider it one of the best accounts of an air journey which has ever come to our notice. We may remind our readers that Imperial Airways and Qantas are combining to form an Australian company to tender for the contract for the Singapore-Australia service



SECTION I.—LONGREACH-SINGAPORE

July 7, 1933

THE big flight commences from Longreach, and we are on our way to London. A good crowd to see us off, and away we sail over the plains of Western Queensland. In 2 hr. 40 min. the 311-mile stage is completed to Cloncurry. After lunch the concluding 80-mile stage to Mt. Isa is flown in 45 min.

To-day has been a very comfortable trip, motion on the plane not being unpleasant, though the air was slightly bumpy. Travel on the *Astraea* is not only a time-saver, but a delight. 391 miles in 3 hr. 25 min.

Mt. Isa lived up to its traditional beauty—sunset on the Selwyn Ranges, and having seen through the magnificent mines and attended a dance at the University Club—to bed in the comfortable Guest House, Sir Herbert and Lady Gepp also being visitors.

July 8, 1933

At 7.15 a.m. the *Astraea's* four engines were opened up, and leaving behind a huge cloud of Mt. Isa dust, surely the finest, most penetrating and voluminous in all Australia, the machine headed for Camooweal.

In 1 hr. 5 min. the 124 miles intervening had been covered and landing effected at the little town at the gateway to the vast open spaces of the Barkly Tablelands.

After refuelling, a rather long wait was necessary to verify a bad weather report from Brunette, which was proved to be unfounded. A heavy dust pall was blowing up at Camooweal, and the wind whistled through the town.

Finally getting away, the weather cleared instead of thickening, and following carefully the thin ribbon of brown track through the green and yellow of the vast downs with its confusing maze of cross-tracks, the 380-mile stage to Newcastle Waters was concluded in 3 hr. 15 min.

Refuelled, by Australian aborigines at the Shell pump, and another long stage of 410 miles to Darwin was completed in 3 hr. 20 min.

It had been a satisfactory day, 914 miles being covered in 7 hr. 35 min., assisted by a quarter following wind.

July 9, 1933

The crew of the *Astraea* spent the day in routine inspection, thoroughly going over machine and engines in pre-

paration for the long water crossings which lay ahead. In the "Airman's Room" at the Victoria Hotel, where appear on the wall the pencilled names of many famous Australian and British airmen, logs were written up and notes made. The "Airman's Room" is definitely British-Empire, not provincial; it is also international—a happy augury for the future.

July 10, 1933

8.10 a.m.: Darwin time; took off for Koepang. Not a quail will beset the aerial traveller if the organisation is adequate for this crossing. In the *Astraea*, with its modern equipment and experienced crew, it all appeared a part of the day's work.

9.10 a.m.: One hour out, and out of sight of land. Making excellent time with a strong wind quarter astern. Flying at 2,000 ft. with an indicated air speed of 110 m.p.h.—a true air speed of 118 m.p.h. "Ground speed" (or should it be "sea speed") is about 145 m.p.h. The flight is calm and comfortable and the cabin is delightfully cool and roomy. This excellent machine, with its four reliable engines, gives a feeling of complete confidence—knowing that if one engine goes the machine can climb and maintain good speed, and if two engines go, the flight could be continued with only an almost imperceptible loss of height.

Sitting thinking (over the Timor) of the historic Timor crossing, and of the service to be, one is particularly struck with the utter unsuitability of single- or twin-engined crossings, and with the absolute necessity for the careful selection of equipment, the latest modern aids to safe flying, such as reliable wireless, the careful selection of pilots and ground staff, very adequate workshop facilities, in fact, in the final count, the necessity for an adequate and thoroughly organised service based on knowledge and sound principles. Any attempt to save on this service, any attempt to cheese-pare on the application of any unsound or unsafe method of operation, will end in disaster and discredit to Australia.

The route from Darwin to Calcutta is sea, jungle and impenetrable forest, islands from which mountains rise to 11,000 ft., fringed by mud foreshores. The flats, where they exist, are mostly intensely cultivated into little areas, and Siam and Burma are a mass of paddy fields, at present, in the monsoon, like an inland sea. Connected,

like islands of safety, right through the country, are landing grounds; but often many hundreds of miles apart. It is the next ground or nothing and many of the grounds in the monsoon are unserviceable.

The shadow of the *Astraea* on the water races below as we make fast time. The "white horses" gather below as the strong wind increases, and the only sign of life is a lone whale seen half-way across which broke water in a smother of spray and disappeared into the depths.

At three hours out the wind died off and the sky became overcast. Fifteen minutes later land appeared through mist and rain storms, and at 3 hr. 40 min. out, after having passed over the Island of Timor, a landing was made at Koepang. The 520-mile crossing was perhaps done in record time.

Koepang has an excellent landing ground, and the Dutch officials were kindness itself. One of them told us there are 4,000,000 natives on the island, and as we flew over, numerous native huts and clearings in amongst the jungle and on the hillsides indicated a large population. Koepang itself, a nest of native huts and red roofs, nestles in the thickest tropical foliage and lends invitation to a visit. Our first introduction to the East, and a small indication of the wonders which are to come.

After shaking hands with the Dutch President, the Customs Officer, and Postmaster at Koepang, we again took the air and set out on the 525-mile stage to Lombok Island. The strong wind had somewhat abated, but was still sufficiently strong to enable a steady ground speed of 130 miles per hour to be maintained. Scattered white clouds floated at 4,000 ft., but Maj. Brackley kept the machine low to take advantage of the following breeze, at 4,000 ft. the wind was dead ahead. Flying along at 1,500 ft. we were soon out of sight of land again; but not for long, as Savu Island soon loomed up ahead and was quickly passed. A possible landing ground was noted. The Island of Sumba was next headed for. Out of sight of land again, then the low shores of the island came into view. Flying along its north-eastern coastline a fine view of the island was obtained. Not very thickly populated, but with a few native villages here and there. The wild horses, which the Dutch authorities told us run loose in numbers on the island, were not seen.

Another stretch out of sight of land, and we were skirting Sumbawa, leaving far to our right Bima, where so many England-Australia flyers have landed. Along the shores of Sumbawa dense jungle met our view shorewards as it stretched away to the foothills of mountains lost in cloud and mist. Here and there a clearing existed invariably accompanied by a few native huts. Flying at 1,000 ft., and as headland after headland was passed, a new view broke out to hold the interest. The wind freshened again and roared up the Straits, whisking us on from Sumbawa, and to a sight of Lombok Island, the end of the day's stage. The *Astraea* roars on; we are skirting the shores of Lombok—flat fertile plains all waving with crops stretched inland, and away on distant Sumbawa and adjacent islands are the cloud-wreathed and jungle-clad mountains. The East at last!—a first taste of the beautiful Dutch Indies.

Soon a perfect landing is made on the excellent Rambang aerodrome and, after being met by officials and the local Shell representative, we proceed to the town of Selong, where we are to spend the night.

Lombok has a native population of 260, and only five whites—Dutch officials. Unspoiled by over-contact with Europeans, here was an untouched gem of the islands. Tropical verdure; the gaily bedecked vehicles drawn by little Timor ponies; the stately carriage and bright garments of the women; the impish children—all lent enchantment.

We dined at 10 p.m., Selong time (11.15 p.m. Darwin time), and as we had breakfasted at 6.45 a.m. Darwin time, it was a long day, several members of the crew going to bed and then getting up for dinner. Fowl, omelet, and bananas constituted the fare, and as the Rest House people were not expecting visitors, the little fowls had to be caught. They were too active for the native cook, and their capture had to be postponed till they went to roost. The normal meal hours for the Dutch officials at Selong are: Breakfast 8.30 a.m., dinner 3 p.m., supper 10 p.m.

There were only three beds in the excellent Rest House, and there were six in our party, but they were huge Dutch beds, so we turned in comfortably, two in each bed, with a "Dutch wife" in between. So to bed, with lizards in the roof chirping like birds, and dog birds in the trees making a noise like a circular saw in action. The dew dripped down like rain from the high roof and eaves of the roof, and the moon shone in patches through the huge tropical trees outside.

We had travelled 1,045 miles in 7 hr. 50 min. flying time—from Darwin to the tropical and glamorous East. What an interest and an adventure! The same will be available to all Australians when the new Empire Service opens.

July 11, 1933

6.50 a.m. local time: Taking off from Rambang. A perfect morning, and the 11,000-ft. Randjoni towers in the background, the last 4,000 ft. of its majestic crater-crested top sticking out of a flat plain of cloud. Now we fly over flat country fissured with great cracks, relics of the day when some giant quake rended the plains. Even the "cracks" are cultivated and all appears wonderfully green and prolific. As we skirt the huge extinct volcano the view is magnificent in the extreme.

A wonderful panorama now unfolds itself, as in quiet comfort, mountain, plain, and sea roll by. Bali, the wonder island, is passed, and we fly on up the coast of Java, finally to land at Sourabaya in tropical Java.

We had wirelessed from over Bali for sandwiches, and sure enough on landing we were met by Mr. Pugh, of the Shell Company, who had a fine hamper with him.

The Dutch company, K.I.L.M., have an excellent hangar at Sourabaya of 100-ft. span. There is a good concrete tarmac area and a fine club-house. All gave the appearance of good organisation and proper catering for both aircraft and passengers. The Shell organisation have two electrically operated refuelling points and no time was lost in filling up and getting under way.

The trip along the Javanese coast, from Sourabaya to Batavia, still in good weather, was full of interest, flat fertile plains predominated, with the mountains, some of them volcanic, half-hidden by cloud away inland.

At Batavia the aerodrome facilities were even better than at Sourabaya, and we were sorry not to be able to accept an invitation to spend the night at Bandoeng, the



Maj. Brackley (fourth from right) and Capt. J. L. Prendergast (third from right) with party at Batavia.



A LIVELY ISLAND : An Aerial view of the marine volcano of Krakatau, between Batavia and Muntok.

headquarters of Dutch air operations. Before we left for the city, a Fokker, F.18, came in from Bandoeng, and an F.7 left for the same place. Very great interest was shown everywhere in the *Astraea*, which is certainly the most up-to-date and efficient aeroplane yet to visit the Indies.

Arrived in Batavia after an interesting drive, which could have been twice as long; we reached the Hotel des Indes. Our flight over Java and stay at this luxurious hotel was teeming with interest. Time was all too short, and we had to hurry on. Java, the Jewel of the Indies, the brightest star in a brilliant constellation, has been well named.

Again a late dinner and to bed with a "Dutch wife," and not a vestige of bedclothes provided, but this time one took the precaution of having a very large afternoon tea at 6 p.m., and so "stayed the distance," with comfort till dinner and the accompanying brilliant night life of orchestral music out on the plaza, and dancing.

The *Astraea* had flown 688 miles in 6 hr. 30 min. and the interest quickened.

July 12, 1933

We are in the air again and soon make out across the water for Muntok, on Banka Island, where we will refuel. It is very cool in the air, contrasted with the muggy ground heat. The coast of Sumatra appears, nothing but dense swampy jungle meeting the sea in an ooze of mud. Not very inviting country to be forced down in. All along the coast are seen the extensive native fish traps.

Brown, the *Astraea's* wireless man, is again in touch with Sydney, Darwin, and Koepang, and Singapore is advised of our probable time of landing. An excellent equipment, speaking of British ingenuity in experimental adoption and honest construction.

At Muntok, a pretty and interesting little island settlement, the *Astraea* is refuelled, and away we go again on the stage to Singapore. At 12 noon we pass over Equator, no longer are we "down under," but "up over," and Prendergast gives the machine a good sharp dip in Salute to King Neptune. "Just as well on a sea

like this," he explained, and except for a few small wooded islands we were out of sight of land at the time.

The *Astraea* roars over Singapore, a maze of shipping, steamers, native junks and bumboats in the harbour, and imposing buildings along the waterfront. We fly over the magnificent Civil Airport in course of construction and land at the military airport, complete with hangars and the usual aerodrome organisation. Half-an-hour after we landed a deluge of rain lasting 25 min. broke, locally called a "Sumatra"—the *Astraea* was safe in the hangar.

A drive through rubber plantations and native villages and we are at Raffles Hotel, where another interesting evening was spent, with the usual later dinner fortified by afternoon tea.

We had flown 595 miles in 4 hr. 45 min., and the *Astraea*, after her wonderful flight from London to Melbourne, was still running perfectly, never giving one moment of trouble. After the long stages one stepped from the machine fresh and clean and without the usual experience of deafness and headache, which is associated with more noisy types of aircraft.

On our next stages—Singapore-Alor Star-Rangoon-Akyab-Calcutta—the worst flying country in the world—over which the monsoon was at its height, a test for the *Astraea* would surely come.

(To be continued)



SINGAPORE : This view, taken from the *Astraea*, shows the reclaimed ground to be used as an airport.

THE SPARTAN "CRUISER"

As our readers know, a Spartan "Cruiser" is now in Australia, having been chartered by Mr. Crawford Green and flown out there by Mr. Lynch Blosse. This machine is well adapted for use in the Dominions, where a high percentage payload is desirable, particularly so as it is coupled with a good top speed. Below we give not only performance figures, but also a diagram of the alternative cabin arrangements which are possible, and a table showing the weight distribution for these various arrangements. It should be noted that these figures are based on an all-up weight of 5,800 lb., but it should be borne in mind that application is being made to increase the weight still further, and it is expected that it will shortly be possible to obtain a certificate of airworthiness for an all-up weight of 6,000 lb.

Spartan "Cruiser" 3-engined Monoplane

(Hermes IV or Gipsy III)

Tare weight	..	..	3,650 lb. (1 655,6 kg.)
Fuel (100 gall.) (454.6 lit.) =			
4½ hr. or 550 miles (885,1 km.)	767	..	(347,9 ..)
Oil (7½ gall.) (33 lit.)	..	..	73 .. (33,1 ..)
Pilot	..	..	170 .. (77,1 ..)
Passengers—6	..	..	960 .. (435,4 ..)
Luggage—30 lb. (13,6 kg.) per passenger	..	..	180 .. (81,6 ..)
Total	..	..	5,800 lb. (2 630,8 kg.)

Garaging width—56 ft. (17 m.)

The normal fuel capacity of 122 gall. (554,6 lit.) is carried in two wing tanks, but extra tankage up to a total of 174 gall. (791 lit.) can be supplied as a standard extra. Tankage or number of seats can be arranged to suit requirements.

Performance, with full load

Maximum speed at sea level	140 m.p.h. (225,3 km.p.h.)
Cruising speed	118 .. (189,9 ..)
Stalling speed	57 .. (91,7 ..)
Climb at sea level	700 ft./min. (3,6 m./sec.)
Take-off run	175 yd. (160 m.)
Landing run (brakes, still air)	120 .. (109,7 m.)
Fuel consumption (cruising)	21 gall./hr. (95,5 lit./m.)
	5.6 miles/gall. (2 km./lit.)
Fuel range (with 100 gall.) (454,6 lit.)	4.76 hr., or 550 miles (885,1 km.)

With any two of its engines it will climb to 5,000 ft. (1 524 m.) and maintain that height with full load.

Power loading (normal)	..	16.1 lb./h.p. (7,3 kg./h.p.)
Wing loading	..	13.5 lb./sq. ft. (65,9 kg./sq. m.)

Cabin, 10 ft. 10 in. × 4 ft.

6 in. × 3 ft. 9 in. (3 318

mm. × 1 380 mm. ×

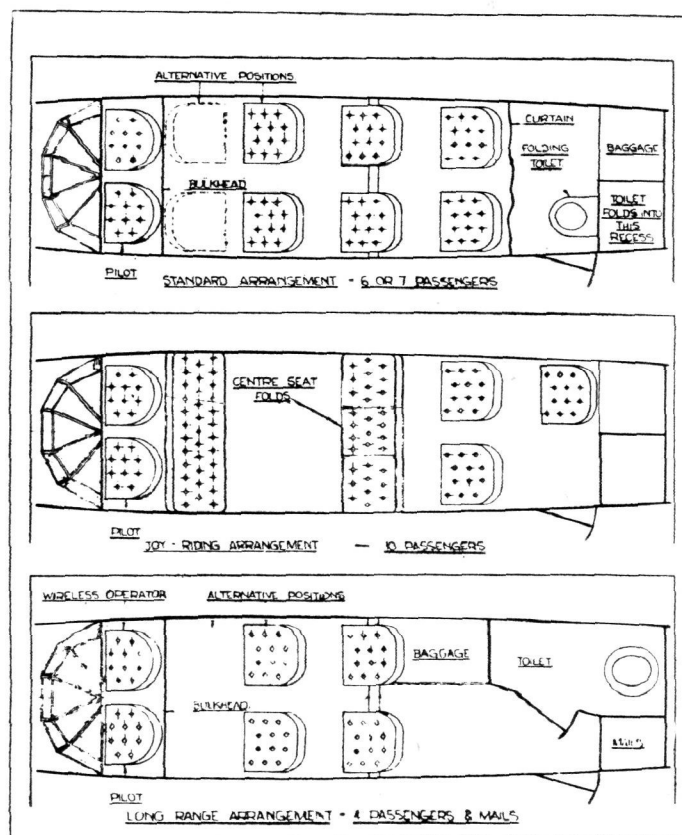
1 152 mm.) .. 182 cu. ft. (5,2 cu. m.)

Luggage compartment .. 10.5 cu. ft. (0,29 cu. m.)

TRANSATLANTIC AIR MAIL ROUTES

THE Prime Minister of Newfoundland, Mr. F. C. Alderdice, when interviewed concerning the statement of Sir Eric Geddes that Imperial Airways had come to a satisfactory understanding with the Canadian and Newfoundland Governments regarding the possible operation of a North Atlantic air route for an air mail service, stated that Pan-American Airways had sought facilities for a New York-Newfoundland service, but that as Newfoundland was already committed for 15 years to Imperial Airways, which had been given exclusive rights for air-base purposes, Pan-American Airways had to make arrangements with them.

Conferences were held during last July at St. John's, Newfoundland, between the Governments of Great Britain, Canada and Newfoundland to discuss the matter. Great Britain was represented by Col. Shelmerdine, Director of Civil Aviation, and Imperial Airways and Pan-American Airways were also represented. The terms of the agreement were not published, but it is understood that they were satisfactory to all concerned. Presumably the possibilities of the route via Greenland and Iceland, and also the direct crossing from St. John's to Ireland, were discussed. The latter is the more direct, but the sea crossing



This diagram shows the alternative cabin arrangement for the new Spartan "Cruiser."

is so long (Alcock and Whitten Brown in their "Vimy" covered 1,950 miles) that not much payload could be carried. The Iceland-Greenland route permits of shorter stages and consequent refuelling, but the weather is very unfavourable, and the route is not likely to be suitable for passengers. Even the pilots of mail planes would run considerable risk. Col. Lindbergh has recently flown over this route on behalf, it is understood, of Pan-American Airways, and he is reported to have said that if the route is operated, "there must be no forced landings." Marshal Balbo and his squadrons also followed this route, and drew a terrifying picture of the ordeal of flying blind through the fogs. In 1924 two American Army seaplanes, Douglas machines with "Liberty" engines, also made this crossing, having lost a third machine which forced landed north of the Faroe Islands. At the same time, Signor Bocatelli and his companion tried the same route in a "Wal," but were forced down by bad visibility, and were rescued by an American cruiser, which had also picked up the missing Douglas machine.

It is expected that Pan-American Airways, in conjunction with Imperial Airways, intend shortly to open a service between Bermuda and New York. British interests, of course, control the Bermuda base. As no British aircraft has yet been produced which could make this flight with any useful payload, it is presumed that American flying-boats will be used for the present, but Imperial Airways will retain the right to participate at a later date when it becomes desirable to do so. It should be remembered that the Azores are now a free airport, as the concession to France has come to an end.

The Germans are about to open their experimental service across the South Atlantic, using the steamer *Westfalen* as a refuelling point. This vessel is using the trailing apron as a means of helping the boats to land and be hauled on board, and there is a catapult device for launching them from the ship.

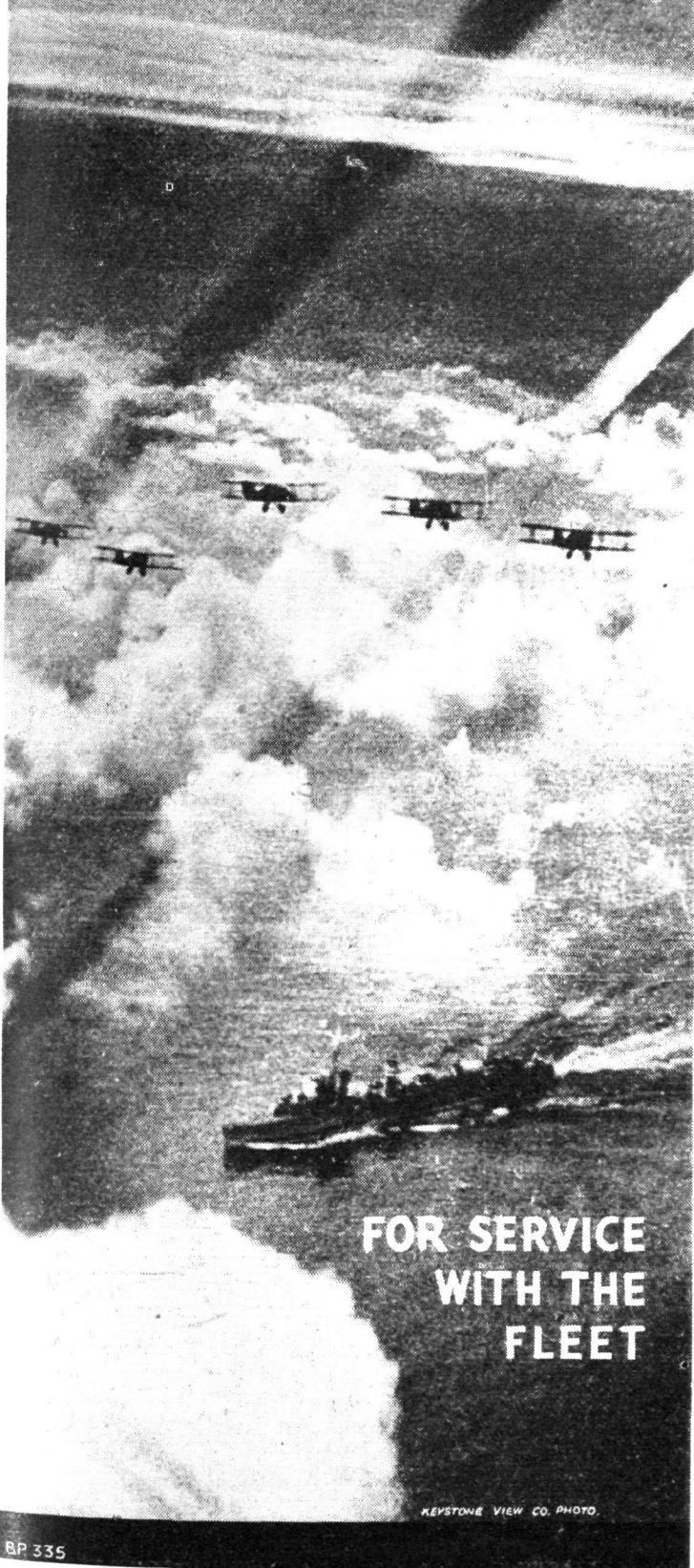
THE FOKKER F.XXXVI

THE first of the new airliners which Fokker is building for the K.L.M. Amsterdam-Batavia service, and which bear the number F.36, is now well on the way to completion. It follows hard on the heels of the F.20, which has now completed its trials and will be put into service next spring on the Scandinavian service.

The new aeroplane has a length of 78 ft. and a wing-spread of nearly 108 ft. Its weight unloaded will be

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ATALANTA



FOUR-ENGINE Monoplane

ATALANTA is the leading British example of aircraft for rapid and luxurious civil transport. It represents the most modern streamline practice which ensures the most economical operation.

The four Siddeley Serval engines are situated in the ideal position on the wing, reducing drag to a minimum and safeguarding the propellers from accidental damage from stones.

The high wing monoplane affords an ideal view for the passengers and crew and provides them with welcome shelter from sun and rain when entering or leaving the machine.

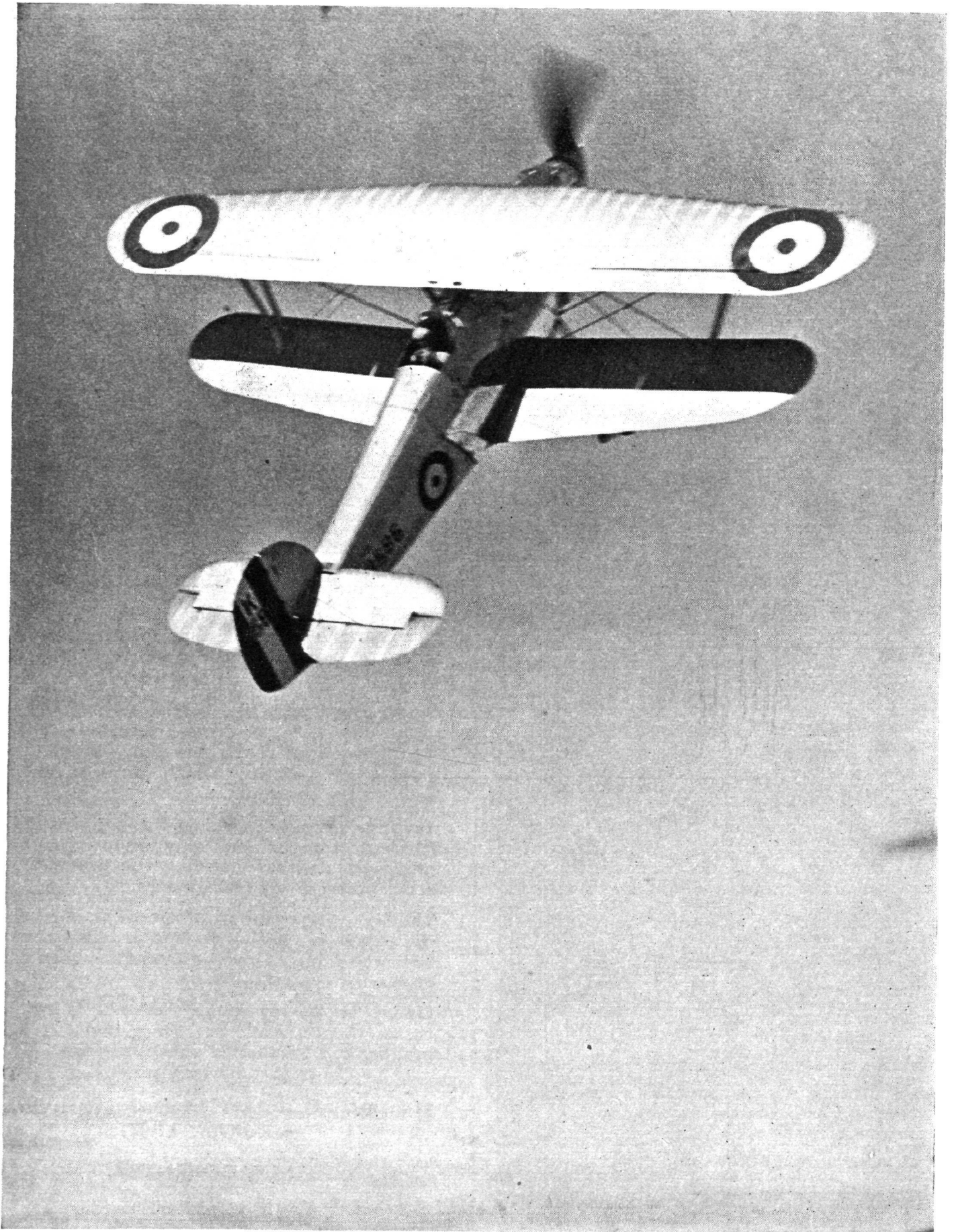
Owing to its low build Atalanta is stable and easily manoeuvred on the ground. Maximum braking can be applied without danger.

**SIR W. G. ARMSTRONG WHITWORTH
AIRCRAFT LIMITED,**

WHITLEY, COVENTRY, ENGLAND

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Save time by using the Air Mail.



"THE HELICOPTER" : A Hawker "Super-Fury" (Rolls-Royce "Kestrel"), piloted by Mr. P. W. S. Bulman, doing a vertical climb above the clouds. As the machine had to cross the path of the "Hart" from which the photograph was taken, the relative movement was extremely fast, and to secure this picture the pilots had to show a high degree of judgment.—*"Flight" Photo.*

Advt.

9 800 kg. (approximately 9½ tons), which, with a useful load of 6 400 kg. (about 6 tons), will give the fully-loaded machine a weight of nearly 16 tons. The four Wright "Cyclone" engines, each developing 700 h.p., will produce a cruising speed of 140, and a maximum speed of 155 m.p.h.

The machine has been designed for use both on the short European services and for the East Indies route. In the former case it will provide accommodation for 32 passengers in four compartments of eight each, and when fully loaded will have a range of about 450 miles. On the Indies route the aeroplane will carry 16 passengers, who will be accommodated at night in folding beds, four in each compartment, and it will then have a range of 900 miles.

The accommodation for passengers and for crew will be quite distinct from one another, and will have separate entrances. The first pilot will sit right forward in the nose of the machine, with the radio-telegraphist in front to the left and facing him to facilitate communication. The second pilot will sit to the right behind the first, and the commander in a small cabin immediately behind. There will be roomy sleeping accommodation for two officers off duty.

The passenger accommodation will be exceptionally lofty and roomy, with a spacious corridor and large windows.

It is intended that the machine shall fly from early in the morning until about 3 o'clock in the afternoon on each stage of the journey to Batavia. This will give the passengers the opportunity of going into the town and having dinner, and returning to the aeroplane to sleep.

NORTHERN TRAVEL

DURING November a machine of Highland Airways, Ltd., will be stationed experimentally at Kirkwall to maintain the ferry service between the Orkney Islands and Wick, on the Scottish mainland. The service will be so arranged that passengers will be able to reach Glasgow or Edinburgh on the same day. The Inverness-Kirkwall service will not be maintained during the winter. Capt. E. E. Fresson, managing director of Highland Airways, Ltd., has recently surveyed a possible route between Orkney and Shetland, a distance of 100 miles. According to Capt. Fresson, in order to operate a regular service, directional wireless would have to be employed and a navigator would have to be carried on each machine. It would be essential for a ground engineer to be stationed at Shetland, and, all things considered, the operation of the route without substantial monetary guarantee would be impracticable.

HUMBER AIR FERRY

As previously announced in FLIGHT, the experimental period of the service ended on September 30, but, owing to encouraging support, it was continued for a further month. Saturday, November 4, was therefore the date for the last services this season. Arrangements for charter will, however, remain as usual throughout the winter for any distance, either at home or abroad, including, of

course, Hull/Grimsby. Well over 1,000 passengers have been carried between the centres in 35 min., and it is provisionally decided to reopen the service on Monday, April 2, 1934, with a faster fleet of aeroplanes, speed and frequency being the aim.

CANADIAN AIR ROUTES TO THE ARCTIC

THE inaugural flights of an air mail service to Camsell River will be made on or about November 29. Camsell River is on the air mail route between Fort Resolution N.W.T. and Cameron Bay, on the eastern shore of Great Bear Lake. Another service carrying letters even farther north will be started about January 15, 1934. This will be from Cameron Bay to Coppermine on Coronation Gulf, in the Arctic Circle.

ODESSA-BATUM SEAPLANE SERVICE

A SEAPLANE service for passengers is shortly to be established between Odessa and Batum. At present, investigations are going on into the route, and plans are being made for the building of sea aerodromes. High-powered Soviet seaplanes will be used on this line. The distance of over 1,000 kilometres, which now takes three and a-half days to cover in a steamer, will be covered in five to six hours.

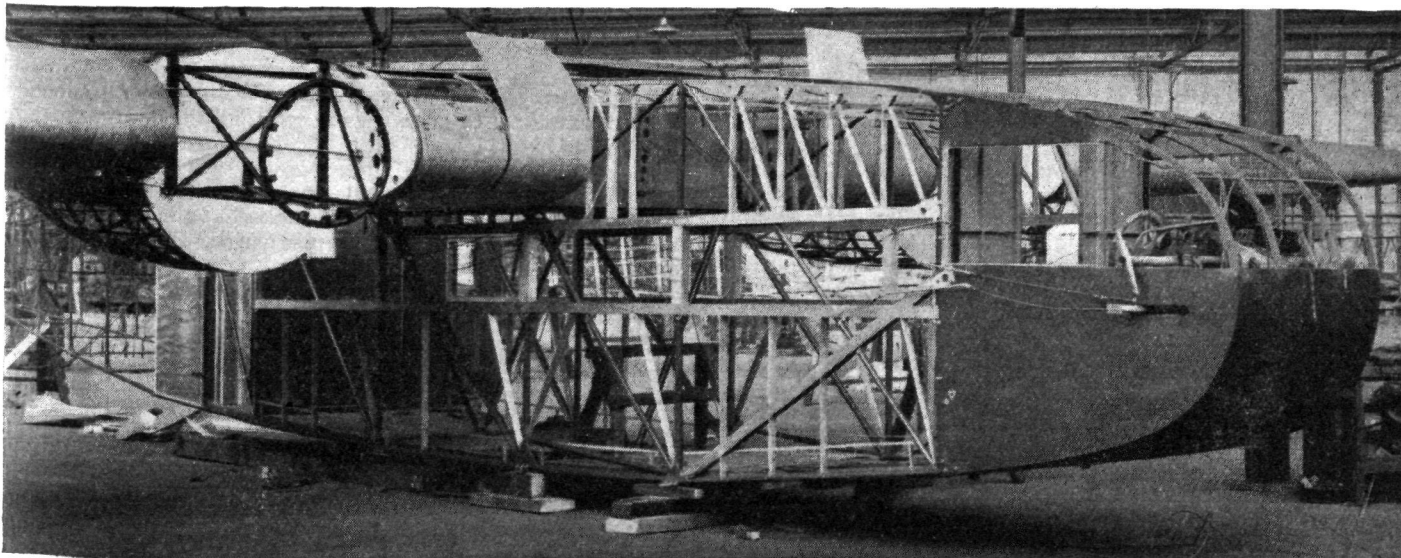
NEW AIR MAIL LEAFLET

THE Postmaster-General announces that the winter edition of the Air Mail Leaflet, giving particulars of the air mail services which will be available on and after November 1 has now been issued. Copies of the new leaflet are being sent to all persons or firms who have applied to be placed on the distribution list. Copies can also be obtained free of charge at any Post Office. Regular users of the air mail services are advised to consult the new leaflet regarding the services in which they are interested, as a number of changes have been made in consequence of alterations in the timing of the air services, etc. Particular attention is drawn to the fact that, as from November 1 and 2 respectively, the latest times of posting air mail correspondence for despatch by the direct air services to South Africa and India in the air mail letter-box outside the General Post Office, London, will be as follows:—England-South Africa air mail, 10.45 a.m. Wednesdays; England-India air mail, 10.45 a.m. Saturdays. The latest times of posting elsewhere will be correspondingly earlier.

The Postmaster-General also announces that the air letter rate to South Africa is now reduced to 10d. per ½ oz. The South African Post Office have also reduced the air letter rate from South Africa to this country to 10d. per ½ oz.

NEW ZEALAND AND ENGLAND-AUSTRALIA AIR MAIL

NEW ZEALAND's contribution towards the England-Australia air mail service will be £5,000. There is little expectation of an early extension of the service to New Zealand by air, but the service from Australia will be a valuable saving of time if suitable steamer connections are arranged.



A NORTHERN FERRY: The Avro 18, which has already been described in FLIGHT for September 21, is now nearing completion at Manchester. Our view shows the nose of the machine and gives a good idea of the large amount of space in the cabin. It is being built for Midland & Scottish Air Ferries, Ltd. (FLIGHT Photo.)

THE ROHRBACH ROTATING WING AEROPLANE

By W. S. SHACKLETON

(Concluded from page 1090)

IN last week's issue of FLIGHT Mr. Shackleton dealt with the history of revolving surfaces as a means of obtaining lift. This week he turns his attention to what has been done more recently in France, the United States and Germany, concluding with some particulars of the proposed Rohrbach machine.

As readers appear to have been a little puzzled by the diagram published on page 1088 last week, the following explanation of the symbols used may be of assistance. They are:—

- d_R Resultant wing force.
- d_V Vertical component of d_R .
- d_H Horizontal component of d_R .
- u Peripheral velocity of rotor.
- v Translational velocity of machine.
- u_r Resultant velocity (and direction).
- α Angle of attack.

Tests and Experiments on Modern Revolving Wing Aircraft in France

An article in the French technical journal, *Les Ailes* (of May 11, 1933), gives particulars of a series of tests which recently have been carried out with satisfactory results in every respect by the well-known aircraft manufacturers, Messrs. Lioré et Olivier, with a wing-wheel aircraft designed by the Swedish inventor, Strandgren. A motor-driven wing-wheel produced a satisfactory lift force (800 kg.) with relatively small power, and with a reasonable forward impulse (corresponding to a speed of 100 km. per hour). With the motor stopped, auto-rotation produced sufficient lift forces from the wing-wheel. These results prove the possibility, with a properly constructed aircraft, of vertical ascent, of hovering without forward movement and of a safe descent with the motor power cut out. Also, these tests have shown that the centrifugal forces and oscillations, even with a number of revolutions 50 per cent. in excess of normal, are transmitted by the wheel structure with a satisfactory factor of safety.

American Tests

During the annual meeting of the National Advisory Committee for Aeronautics (N.A.C.A.), in the first half of May, 1933, a report was delivered on a series of wind-tunnel tests made with a full-size set of Platt wing-wheels, similar—it was said—to the design developed by Dr. Rohrbach. In the course of these tests smoke was used in order to observe the movement of the air. The American tests have also shown that the wheels produce great lift forces when the aircraft is flying normally or when hovering without forward movement.

The following report is taken from *Aviation*, June, 1933.

N.A.C.A. Report

"The Cyclogiro."

"'Lift without speed' was the text of the opening portion of the talk by J. W. Crowley, Jr., chief of the Flight Research Section, who has been conducting a special study of rotating wing systems of all types. It was Mr. Crowley who introduced to the audience the 'Cyclogiro,' the paddle wheel rotor design, sponsored in this country by Haviland H. Platt and in Germany by Dr. Adolph Rohrbach. Computations indicate that a 3,000 lb. airplane utilising this principle, with constant velocity rotor and cams, would attain a speed of approximately 100 m.p.h. with an engine of 300 h.p., assuming that 270 h.p. remained after gear friction losses. The power required would be a minimum of 45 m.p.h. and increase 60 per cent. at zero air speed, and 90 per cent. at 100 m.p.h. The vertical rate of climb computed was 700 ft. per minute and the maximum rate of climb 1,500 ft. per minute."

The computed maximum rate of climb is approximately 30 per cent. better than would be likely with a conventional aeroplane of the same power loading. The efficiency of the gearing would not be lower than 95 per cent. or some 15 per cent. better than would be possible with an airscrew working under optimum conditions.

In a technical note issued by the National Advisory Committee for Aeronautics and entitled "Simplified Aerodynamical Analysis of the Cyclogiro Rotating-Wing

System," by John B. Wheatley, of the Langley Memorial Aeronautical Laboratory, the summary states:—

"The aerodynamic principles of the cyclogiro are sound; hovering flight, vertical climb, and a reasonable forward speed may be obtained with a normal expenditure of power. Auto-rotation in a gliding descent is available in the event of a power-plant failure."

German Tests

Dr. Rohrbach's extensive research work, submitted to the competent judgment of the Deutsche Versuchsanstalt für Luftfahrt, more than confirms the excellent results obtained in America. His machine shows marked superiority in the relatively large span and high aspect ratio of the wings, together with an adequate peripheral velocity and diameter of the rotor, resulting in overall efficiencies comparable with a conventional aeroplane. It is, however, in the wing oscillation control that the Rohrbach machine shows the greatest technical advance over other types of rotating wing machines. The effective angles of incidence at all speeds are positively and progressively controlled throughout the circle of revolution to produce forces of the required direction and amount with the least expenditure of power. The wing oscillation controls have been reduced to such a simple form that the pilot can quickly and easily adjust the effective incidence and feathering action to suit any required speed or inclination of flight within the capacity of the machine.

Some data relating to the Rotating Wing Machine

A machine similar to the type illustrated in the photo published last week has formed the principal basis for calculations and design of details. It is fitted with one engine of 240 h.p., driving the rotor-shaft through a worm-or bevel-gear—a one-way clutch or free wheel being interposed. The wings, which have a mean aspect ratio of 14:1, project 14½ ft. on each side of the fuselage. Three wings are fitted to each rotor, these being separately carried on steel struts and streamline section tie rods. These members carry all centrifugal and aerodynamic loads between the wings and the rotor-shaft. The wings revolve with a maximum r.p.m. of 420, corresponding with a peripheral speed of 260 ft. per second. The minimum rotational speed to produce sufficient lift forces is 270 r.p.m. (peripheral speed 167 ft. per second). Each pound of weight produces a centrifugal force of 362 pounds at 420 r.p.m. and 150 pounds at 270 r.p.m. The greatest possible aerodynamic forces amount to only some 12 per cent. to 18 per cent. of the centrifugal forces, which latter are of a uniform and steady character. Consequently violent manoeuvres do not overstress the wings to anything like the same degree as with fixed-wing aeroplanes, where the ratio between normal and maximum wing forces can be as great as 7 to 1 or even more.

If specially required, the revolving wing aircraft, with a temporary sacrifice of its ability to climb vertically, would safely carry considerable overloads. This is clearly shown in the weight data. With the total loaded weight increased to such an extent that the minimum air-speed is 21 km./hr. (13 m.p.h.), the estimated disposable load is 76 per cent. of the empty weight. The wings make 7 complete oscillations per second at 420 r.p.m. and 4.6 at 270 r.p.m. Investigations have shown that the torsional deformation of the wings can be kept very small, thus avoiding incorrect angles of attack through twisting. Each of the two sets of revolving wings, right and left of the aircraft fuselage, forms a stable structure with regard to any kind of loading. Without any experimenting the pilot can adapt the oscillation control to any practical operating condition, so that a maximum efficiency is obtained. The pilot is also in a position to vary the direction and the amount of the generated air force at any moment, to meet any requirements according to his judgment. In order rapidly to reduce the translational speed of the aircraft the pilot can temporarily give to the resultant air-force a backward inclination without losing any lift.

A diagram shows on page 1123 the air forces acting on the revolving wings in various positions and under different operating conditions. The air forces resulting in one revolution of the wheel are also shown. As indicated

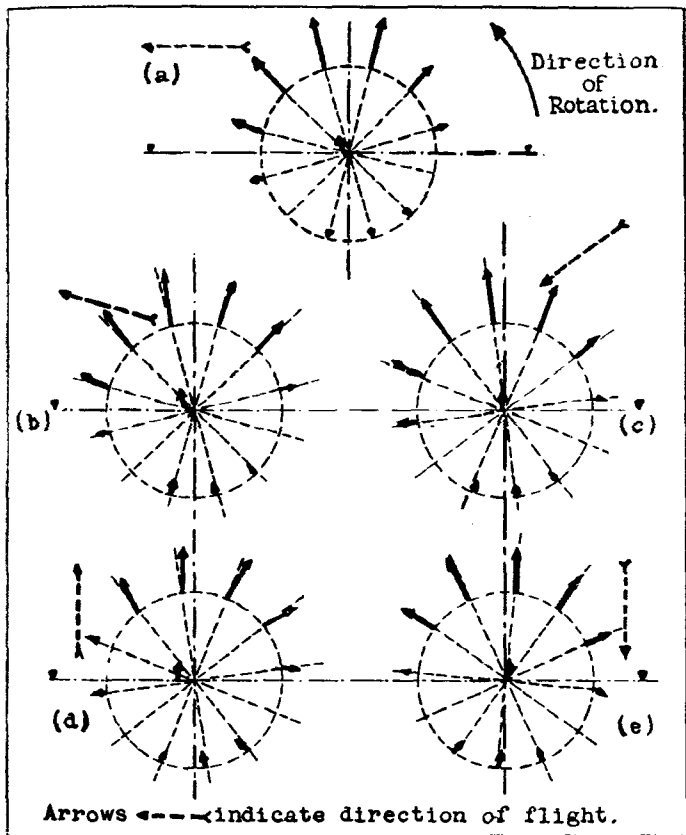


Diagram showing various wing forces acting under different conditions of flight. These are (a) horizontal flight ; (b) upward inclined flight ; (c) downward inclined flight ; (d) vertical ascent ; (e) vertical descent without motor power.

by the relative direction of flight to the horizon, the figures represent the condition of:—(a) Horizontal flight; (b) upward inclined flight; (c) downward inclined flight; (d) vertical ascent; (e) vertical descent without motor power, with the wings auto-rotating and continuing to produce sufficient lift forces.

Dimensions and weights and tank capacities of the machine referred to above are as follows :—

Dimensions—Length, 28 ft. ; height, 14 ft. ; span, 33 ft.
Motor—1 motor of 240 h.p.
Tank capacity—Fuel, 80 gals. ; oil, 7 gals.

Weights—
Weight empty (structure weight, instruments, equipment for 3 persons) 1,500 lb.
Useful load (fuel and oil, 3 persons) 600 ..

All-up weight (for vertical ascent).. .. 2,100 lb.

If a little of the vertical ascent and of the hovering characteristic is sacrificed, the dead weight and disposable load may be increased as follows:—

Minimum speed relative to air.	All-up weight.	Useful load.
Zéro	2,100 lb.	600 lb.
13 m.p.h. = 19 ft. per sec. ..	2,640 ..	1,140 ..

Flying performance with 2,100 lb. All-up weight

Horizontal speed at sea level :	
Full throttle	124 m.p.h.
Engines throttled 25 per cent. ..	106 ..
Minimum speed at sea level	0 ..
Backward speed at sea level	19 ..
Ceiling	14,800 ft.
Ceiling when hovering without forward movement :	
with a wind of magnitude 2 (German scale), i.e., 19 ft. per sec.	7,250 ..
with no wind	1,640 ..

With an all-up weight of 2,640 lb :

Horizontal speed	118 m.p.h.
Ceiling	8,850 ft.

Range figures :				
Weight empty	1,500	1,500	1,500	1,520 lb.
Disposable load :				
Pilot	176	176	176	176 ..
Passenger	165	—	165	— ..
Passenger	—	—	165	— ..
Fuel and oil	259	424	634	944 ..

All-up weight	2,100	2,100	2,640	2,640 ..
Average cruising speed	115	115	112	112 m.p.h.
Range	254	425	650	965 miles

The performance figures based on careful calculations are as above.

The ceiling, when hovering so that the aircraft is stationary in relation to the ground, is considerably increased if a wind is blowing. The maximum ceiling of the hovering machine in a wind of 19 ft. per second is some 7,500 ft. higher than the ceiling obtained when hovering in still air. These figures have been confirmed by the revolving wing reports from America, referred to earlier in this article, which state that hovering requires 60 per cent. more power than forward flight at 45 m.p.h., and when it was also found that the rate of climb vertically was increased from 700 ft. per minute when climbing vertically to 1,500 ft. per minute up an inclined path. Referring to the power requirements of revolving wings and assuming a certain all-up weight of the aircraft, the velocity of the downward accelerated airstream increases with the reduction of the size of the rotor and the space traversed by revolving wings, this increase resulting in a corresponding increase of the engine power required to hover and to fly forward. The earlier types of airwheels and revolving wings were either of impracticable proportions or lacked certain structural and functional elements indispensable to proper working except with impossibly small power loading.

The Rohrbach machine can, however, be confidently expected to achieve the following power loadings:—

- With ability to hover up to 11 lb. per h.p.
- With minimum air speed of 17 m.p.h., 17.6 lb. per h.p.
- With minimum air speed of 34 m.p.h., 24 lb. per h.p.

Control System

Lateral control is effected in the usual manner by lateral displacements of the control-stick, which, by means of a differential device of the wing oscillation control, produce different lift forces on the two wing sets.

The directional control is operated through foot-levers or pedals, as usual. The controlling effect is obtained by means of a differential device of the wing oscillation control, so that different propelling forces are produced on the two wing sets. It may be that a rudder connected to the same foot-levers allows a finer regulation of the directional control at high speeds. Practical trials will show whether such a special rudder is desirable or not.

The flying attitude and the translational speed are controlled (with a corresponding adjustment of the engine controls) by means of the wing oscillation control, through a displacement of the control-stick in a fore and aft direction, in the sense of the desired movement of the aircraft.

It is impossible to "stall" the revolving wing aircraft. Calculations prove that at all flight speeds, including zero speed, the Rohrbach machine would have strong positive stability in pitch and in roll. In yaw there would be, if not a slight positive stability, at least a neutral condition.

Efficiency

An advantage of the revolving wing machine is that a mechanical transmission carries the engine power direct to the wings, avoiding the considerable aerodynamic losses of the usual airscrew. Even with an airscrew working under optimum conditions the gearing would show 10 per cent. to 15 per cent. better efficiency, a virtual gift of 50 h.p. to 75 h.p. in the case of a 500-h.p. machine.

On the other hand, the aerodynamic drag of the shaft and of the plurality of spokes and struts necessarily produces a certain parasite drag and loss of power. Tests and calculations have shown, however, that this loss is comparatively small. A further important aspect of the matter is that the speed of the downwash is low and that the actual aerodynamic angles of attack of the wings are always relatively small and close to the angles giving the greatest L/D values for the aerofoil. Consequently an overall efficiency or lift/drag ratio of 1:8 or 1:9 can be confidently expected in this type of aircraft.

Although the exact performance can only be proved by means of actual flight tests, the present performance calculations deserve the same degree of confidence which is given to similar technical calculations in other fields, where often fundamental factors have had to be built up without the aid of the special test results which are available in this case.

Mass Production Advantages

The revolving wings comprise a plurality of identical structural elements of simple design which are easily made interchangeable, and can be produced in series at a cheap rate in any modern aircraft factory equipped for metal aeroplane construction.

**Oscillation Control of Rohrbach Rotating Wings—
Deficiencies of types hitherto proposed**

Relative to the respective tangents to the circle of revolution, the angular oscillation of revolving aerofoils with eccentric or crank control is approximately a harmonic sinus-oscillation. With an appropriate wing loading, this form of oscillation gives satisfactory efficiency and produces lift forces sufficiently large to support an aircraft in the air, if, but only if, the translational speed of the aircraft remains small in proportion to the revolving velocity of the wings. At higher translational speeds a sinus-oscillation of the wings produces alternatively too small or too large aerodynamic angles of attack. On the other hand, an oscillation of the "normal-intersection" type would produce at high speeds a much better efficiency than could be obtained with a sinus-oscillation under the same conditions. The "normal-intersection" oscillation, however, at low translational speeds produces unfavourable aerodynamic angles of attack. The "sinus-oscillation" is therefore only suitable for hovering or very low speed flying, and the "normal-intersection" oscillation only suitable for high speed flying. Under most operating conditions either of the two oscillation systems will result in unreasonably high engine power requirements.

The excess power necessary in the case of the "normal-intersection" oscillation at low flying speeds causes a serious reduction of the weight which can be lifted under these conditions, and adversely affects climb and ceiling. Conversely, the excess power required by the sinus-oscillation at high speeds would be equally detrimental to the utility of revolving wing aircraft.

With either of the two oscillation systems only two values are variable, viz., radial and peripheral positions of the eccentric or crank with the sinus-oscillation control and radial and peripheral position of the "normal-intersection" point of the "normal-intersection" oscillation. However, to adapt the angular oscillation to every condi-

tion of flight, six values have to be considered, of which five are variable, viz.:

- | | | |
|-----------------------------|---|---|
| (1) Unvarying direction and | } | of the revolving velocity of the wings. |
| (2) Variable amount | | |
| (3) Variable direction and | } | of the airflow through the circle of revolution. |
| (4) Variable amount | | |
| (5) Variable direction and | } | of the air force required for various conditions of flight. |
| (6) Variable amount | | |

Since the problem is to control the *angles* of the oscillation only, the *ratio*: amount of the revolving velocity (value 2), to the amount of airflow speed (value 4), need be considered in the design of the oscillation control. This leaves four variables to take care of.

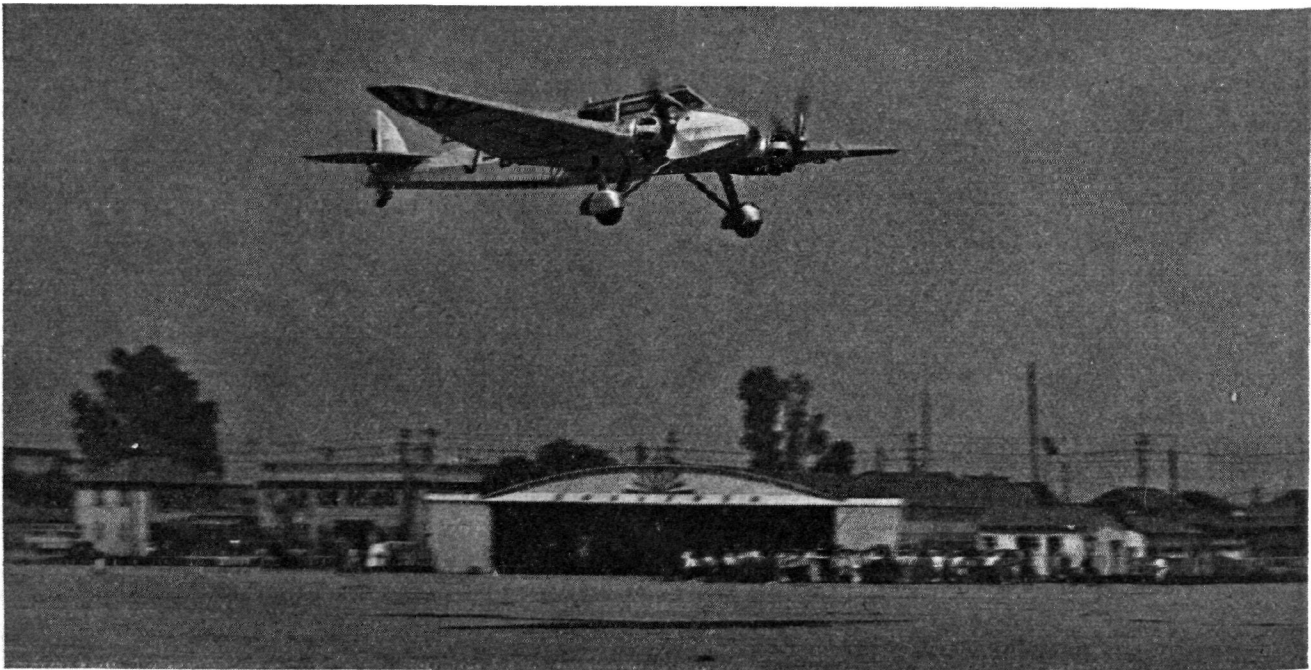
It is, on general principles, impossible to take care of the variability of the said four values by means of only two variable members, as in the above-mentioned incorrect oscillation control systems.

Theoretically it might be possible to find, on the drawing board, for certain flight conditions, compromise adjustments of the sinus- and/or normal-intersection oscillations, thus avoiding, to some extent, the worst effects of their technical incorrectnesses. In *practical* flying no amount of practice would ensure the finding of such an adjustment, since the pilot has no means of ascertaining under any given conditions which kind of oscillation adjustment of the two variable values would produce the best compromise with regard to the four aforementioned variables and therefore with regard to the flying efficiency. Therefore, it is certain that the two types of oscillation control hitherto described would, in practice, result in still greater aerodynamic losses than those corresponding to their theoretically best compromise adjustments.

The most efficient aerodynamic angles of attack of a revolving wing vary progressively throughout the period of one revolution, and they vary also, like the effective angles of attack of conventional aeroplane wings, with different altitudes and loading and flying conditions.

It is, of course, just as necessary to know and to use the most efficient angles with revolving wing aeroplanes as with fixed wing machines.

The Rohrbach wing oscillation mechanism with its simple combination of automatic and manually operated adjustments represents the first physically correct solution of the problem of oscillating the wings in such a manner that at all speeds and under all flying conditions the wings are working with the scientifically best angles of incidence. Unfortunately, due to the technicalities connected with the International Patent Laws, it is not possible in this article to give drawings and diagrams showing the actual construction of this oscillation control.



RIISING WITH THE SUN : A "Monospar" (two Pobjoys) flying over the Asahi Aerodrome at Osaka. This machine is used by the Asahi Newspaper Co. for service between Japan and Manchuria.

Some British Triumphs with NAPIER Aero Engines

1918 A Napier-engined D.H. aeroplane climbed to a height of 30,500 ft. in 66 min., the greatest height at this date reached by an aeroplane.

1919 A Napier engined D.H. aeroplane won the Aerial Derby. Speed, 129.3 m.p.h.

1921 A Napier engined Gloster aeroplane won the Aerial Derby. Speed, 163.4 m.p.h.

1922 A Napier-engined Supermarine flying boat regained the Schneider Trophy for Great Britain at a speed of 149 m.p.h.

1923 A Napier-engined Gloster aeroplane won the Aerial Derby. Speed, 192.4 m.p.h.

1926 The first non-stop crossing of South Atlantic Ocean carried out by Commandante Franco flying a Dornier flying boat with two Napier engines.

1927 Schneider Trophy regained for Great Britain by a Supermarine-Napier seaplane flown by Ft.-Lieut. S. N. Webster, A.F.C. Speed, 281.669 m.p.h. Two machines completed the course—both fitted with Napier engines.

1928 The greatest formation flight ever carried out was made with four Supermarine-Napier Southampton flying boats, each fitted with two Napier engines. The machines flew from England to Australia, round Australia, and back to Singapore, covering 180,800 engine miles without mechanical trouble.

1929 The first non-stop flight from England to India was carried out with a Fairey monoplane fitted with Napier engine. 4,130 miles in 50 hr. 38 min.

1930 For the fifth successive year Napier engines were selected by the Royal Air Force for their annual Service flight from Cairo to Cape Town and back. As on previous flights, no mechanical trouble was experienced.

1931 The first and only non-stop flight from England to Egypt was carried out with a Fairey monoplane fitted with Napier engine. 2,857 miles in 30 hr.

1932 Captain Sir Malcolm Campbell set up a World's Land Speed Record of 253.968 m.p.h. with his Napier-engined "Bluebird" car.

1932 Fourteen officers and 534 men were transported from Ismailia to Iraq and back—a distance of 1,728 miles over nearly waterless desert. The aircraft used were Vickers "Victoria" troop carriers, each fitted with two Napier Lion engines.

1933

Squadron-Leader O. R. Gayford, D.F.C., A.F.C., and Flight-Lieut. G. E. Nicholetts, A.F.C., by flying a Fairey (Napier) monoplane from Cranwell, England, to Walvis Bay, South-West Africa, set up a World's long distance non-stop flight record—a distance of 5,309 miles covered in 57 hr. 25 min.

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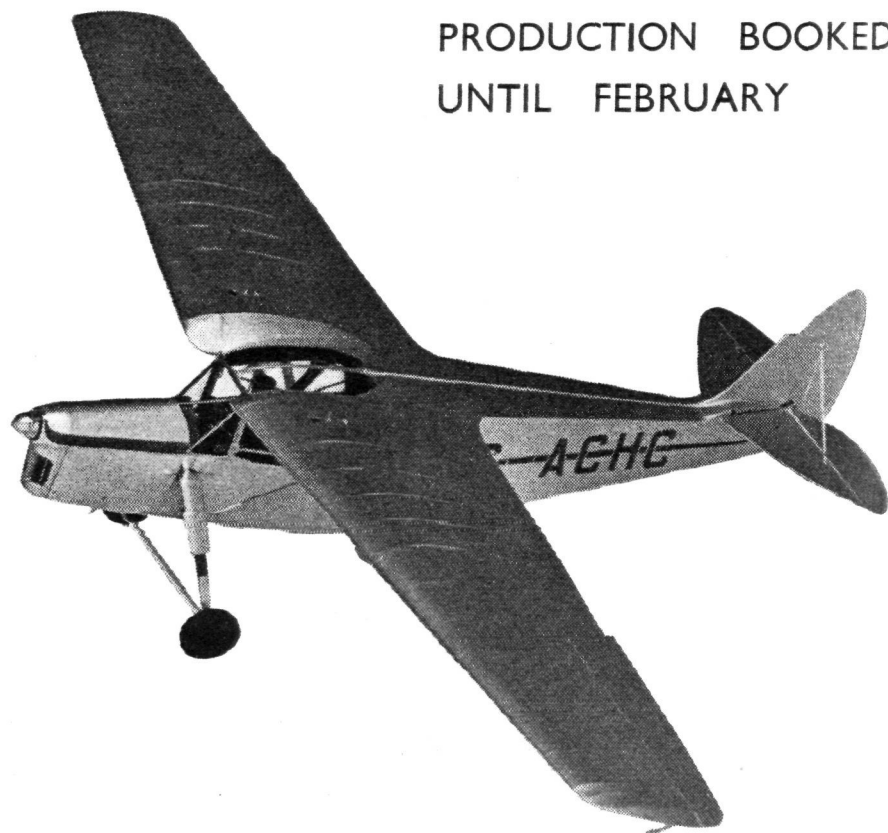
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AIR TRAFFIC CONTROL AND THE PRIVATE OWNER

By A. VIATOR

I FOUND it of extreme interest to read some of the comments which followed Maj. Mealing's recent paper on "Air Traffic Control." From the use of such phrases as "Private owners, are we the last of our race?" and "Sounding the death knell of private flying," it would appear that a number of private owners scarcely understand this question in its entirety.

There is no intention on the part of the Air Ministry or anyone else to try to freeze the private owner out of the skies, and the control zone system is only to be in force on days when weather conditions are such that it is not particularly wise to fly around a busy airport without wireless.

When conditions of bad visibility are in force, in fact, the average private owner, who is not compelled to fly, will probably stay at home for his own sake. These conditions only occur on a limited number of days in the year, and not very frequently during the summer season.

Everybody who has taken any interest in the matter will know that the controlled zone which is proposed is an area of about 10-15 miles round the Airport of Croydon, within which, in bad weather, danger of collision is bound to exist because of the increasing volume of air traffic converging upon and radiating from the airport. At present all wireless-equipped aeroplanes are kept clear of each other and guided in and out of Croydon by means of close co-operation with the Traffic Officer in the Control Tower.

It is not the intention of the Air Ministry or of the other people concerned in the present attempt to eliminate the very grave danger attendant upon unregulated traffic in a congested area (that is, the Air Traffic Companies and the R.A.F.) to give undue preference to any one part of the flying community.

What is being said is, that whereas aircraft fitted with wireless and in close communication with the ground control, can be so guided, instructed, or advised that they will not be a menace to other traffic, non-wireless machines must not be allowed to roam at will in a dangerous area, because they constitute a menace to themselves and to all other traffic.

Here is no question of private owner *versus* the rest, but equal treatment for all. If a R.A.F. aeroplane without wireless or a commercial machine not working wireless wishes to proceed to Croydon when the zone system is in force owing to bad visibility conditions, the pilot of that machine will have to land outside the zone and ask permission. If traffic allows, he will be told to come on along a route or at a height where he will be safe from collision danger. Quite naturally, this will have to apply to non-wireless private owners, but if a privately-owned machine is working wireless, it will have exactly the same treatment from the Control Tower as a 40-seater commercial machine or a Royal Air Force bomber carrying wireless.

The whole thing is merely a matter of vitally necessary communication with the ground Traffic Control in bad weather. No aeroplane will be allowed to enter the controlled zone if it is already too congested for additional traffic to approach, and it is quite obvious that all machines within the area must be able to receive information and instructions from the Central Ground Control if air traffic chaos is to be avoided.

When contemplating the terrible risks which machines flying dumb, blind and deaf in thick weather can place upon the whole of the traffic within an area, it is useless to bemoan the fact that private owners cannot afford to fit wireless and could not perhaps use it adequately if they had it. I am not justified in charging about on the roads in a car not fitted with brakes to my own and everybody else's peril because I cannot afford to fit brakes, and there is an end to the matter.

After Maj. Mealing's paper a number of questions were asked and comments made which seemed to indicate that private owners felt that preference should be given to them which it was not proposed to extend to other groups in the flying community. The relative importance of a private owner flying for pleasure or possibly on urgent business and that of a big air liner with 30 or so people, most of them on equally urgent business, a machine, moreover, carrying His Majesty's mails, is a question which can safely be left to the judgment of any unbiased individual and need not detain us here.

The question I refer to was, "Why should the airways (*i.e.*, the main lines to and from the Continent used regularly by scheduled air services) be kept clear for commercial machines?" "Policemen," added the speaker, "were not planted about our roads to keep private cars out of the way of lorries and charabancs."

The answer is, that the airways—or rather the controlled zone—is not to be kept clear for commercial machines, but for machines of all classes so equipped that they can enter it with safety. If policemen are not planted about our roads to keep private cars clear of lorries and charabancs, they very soon would be in the parallel case of private cars proceeding at speed, frequently on the wrong side of the road, without horn, brakes or headlights during foggy weather, up and down and across the Brighton road with week-end traffic about.

At a recent meeting on the subject of Air Traffic Control, an interesting contrast to the above attitude was afforded by the point of view of the Royal Air Force as expressed by its representative. The R.A.F. does a very great deal of fog, cloud and bad weather flying in the vicinity of London in pursuit of its lawful occasions, and it meant making a definite sacrifice when the R.A.F. representative announced that, when "zone control" was in force, R.A.F. machines without wireless would be instructed to land outside the zone and communicate with the Croydon Control Tower just like all other aircraft. Maybe the R.A.F. is as entitled as anyone else to refer to the commercial machines which are making history on Empire routes as aerial lorries and charabancs. It is purely a matter of good—or bad—taste, but the R.A.F. at least escapes the swift retort of "air-hog."

In order to realise the position quite clearly, it is necessary to know what can happen in actual practice when a casual and from a traffic point of view uncontrollable aeroplane suddenly drifts into an area where all other aircraft are controlled.

On one particular occasion, to take a single example from many, a number of big passenger machines were approaching Croydon in weather conditions which, though distinctly bad, by no means precluded the possibility of coming in to land, especially in view of the guidance they were receiving from the Control Tower. Every machine was being kept clear of all danger of meeting another in the fog.

Then, like a submarine amongst peaceful merchantmen, the presence of a small aeroplane was reported. The pilot flew up and down and round and round for a considerable time in an attempt to find the aerodrome and land. He could be given no assistance nor advice, and he could not be directed to another airport where conditions might have been perfectly good. The officer in the tower informed the other incoming machines that somewhere near Croydon, flying in one direction or another, they might meet a small aeroplane very suddenly when both they and he were moving at about 100 m.p.h. in very bad visibility. Several of the airliner pilots having their very grave responsibilities in mind, decided to abandon the idea of coming on to their home airport, and put down at emergency aerodromes where there were few facilities and where they were obliged to picket their machines out for the night. The disorganisation, trouble and expense involved were very much to be preferred to the risk of collision.

The private owner on this occasion had the airport and its environs more or less to himself, and it may be that this situation is what the private owner referred to when, at the end of Maj. Mealing's paper, he remarked that instead of interfering with private flying the fully-equipped commercial machines should be directed to the various aerodromes round London.

We of the air traffic companies, with our responsibilities to the travelling public, can hardly be expected to agree that private owners should be allowed to constitute a serious menace to air traffic because they are not in a position to equip themselves with what is agreed on all sides to be a vitally necessary means of communication with the ground control.

Everybody concerned may sympathise with the private owner in the difficult position he is placed in, but unless those who object to the Air Traffic Control Scheme which is proposed can think of some means of overcoming the difficulty of the non-wireless machine, the answer must obviously be that such aircraft must obey the new regulations when they come into operation.

From the Clubs

CARDIFF AEROPLANE CLUB

Flying times for the week totalled 7 hr. 55 min. dual, 7 hr. solo and 1 hr. tests. First solos were done by Messrs. H. M. Budgen and H. L. Armstrong. A landing competition for members was held on Sunday, November 5, the winner being Mr. R. Foriester Walker.

LONDON AEROPLANE CLUB

The total flying for the month amounted to 220 hr. 35 min. Among new members whom the Club has pleasure in welcoming are Messrs. W. C. Mycroft, H. E. Taylor and H. de Malet. The Club have had the opportunity of flying Capt. de Havilland's "Puss Moth" lately, which he lent to the Club. During the winter months a series of lectures will be given on Elementary Navigation, Engines, and Rigging. The charges for these courses are 3 guineas for six lessons in navigation, and 3 guineas for six lessons in engines and rigging. Members may pay 10s. 6d. for one lesson if they do not find it necessary to take the full course. The lectures will take place on Saturday afternoons, starting Saturday, November 11, from 4 p.m. to 5 p.m. The annual dinner and dance will be held at the Park Lane Hotel on Wednesday, December 13.

BRISTOL AND WESSEX AEROPLANE CLUB

First solos during the week were Miss M. Hands and Mr. R. J. Lee. Mr. F. A. White also started training for a "B" licence. Much interesting commercial work has been done lately; for instance, 2 cwt. of chocolates were carried from Bristol to Manchester, and 1½ cwt. to Birmingham, also 3 cwt. of cocoa to Birmingham and 5 cwt. of wireless sets and spare parts to Stoke-on-Trent. The flight to Stoke-on-Trent was done on a "Dragon Moth" and the other flights on a "Fox Moth," both belonging to Western Airways, Ltd.

LEICESTERSHIRE AERO CLUB

During the month of October 46 hr. 15 min. flying was done, rain, high winds, hail and snow being a handicap. Eleven cross-country flights were done to eight aerodromes and 16 aeroplanes visited Desford. The Club's "Moth" is now resplendent with a complete new skin and upholstery. The Leicestershire Aero Club dance will be held at the Palais-de-Dance, Leicester, on Friday, December 1.

NORTHAMPTONSHIRE AERO CLUB

The week's weather has again been unsuitable for flying. On Saturday, November 4, a Concours d'Elegance for aeroplanes was held at Sywell Aerodrome, organised by the Lamport Hall Club. In spite of the really bad weather, five competitors turned up; they were Leicestershire Aero Club, Mr. Perry Tyzack, Mr. Philip Symington, Capt. Geoffrey Shaw and Mrs. Cleaver. The latter was accompanied by Mr. Percival. The winner of the competition was Capt. Geoffrey Shaw, whose "Gipsy Moth" was beautifully turned out. Later in the evening the



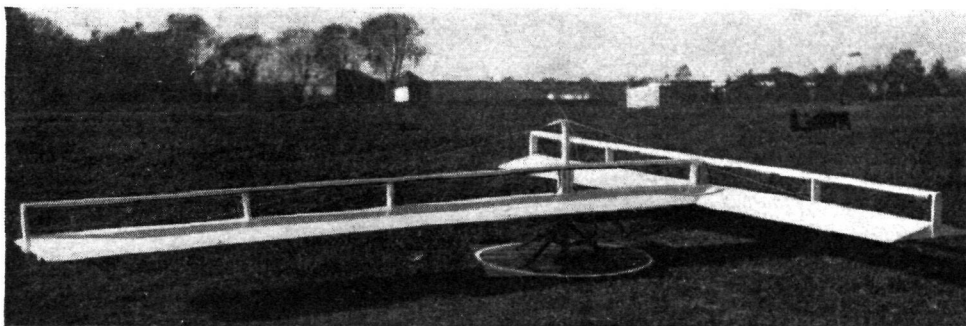
Mr. Edwin Denis A. Bigg who, flying a Miles "Hawk" (Cirrus III), left for Nairobi, Kenya, last week. Mr. Bigg, who is an Ex-R.A.F. officer, is the first to fly one out to Africa, where he is going to start a Flying School and Air Taxi Company.

prizes were presented at Lamport Hall, and there was great weeping and gnashing of teeth when it was discovered that the cup had not arrived back from the jeweller's and could therefore not be filled up in the customary manner. It was arranged, however, that it should be sent up to the aerodrome later.



FOR PRIVATE FLYING : This recently designed Koolhoven F.K.47 was built to a private order. It has a cruising speed of 107 m.p.h., carries two persons with luggage, fuel for 6 hours, and weighs 1,850 lb. fully loaded.

FOR NIGHT AND DAY: This new type of wind Tee is a product of the N.F.S. repair shops at Hanworth, and is so arranged with tubular electric-light bulbs placed horizontally above the white Tee that the whole of the surface is adequately illuminated and at the same time obviates glare to the pilot. This Tee can also be set by the Chief Instructor on the ground and used to indicate the landing direction to be used by pupils when there is no wind. (FLIGHT Photo.)



BROOKLANDS

Strong winds prevailed during the week which curtailed flying, 47 hr. dual and 34 hr. solo being flown. Mr. Graham completed his "A" licence tests. Visitors during the week included Mr. Van Marken from Holland in his "Tiger Moth," accompanied by Mr. S. Horden in another "Tiger Moth," Miss Clark from Reading, and other machines from aerodromes in the vicinity. Brooklands Airways' machine has returned from Strasbourg and Paris and has since been kept busy joyriding and doing short taxi flights. New members during the week were Messrs. L. R. Glegg, C. H. Hunter, R. Kitley, E. C. Middleton and F. Ramsay. Mrs. Battye's machine has been turned out after repairs and delivered to Reading complete with new C. of A., and she had some advanced dual with Capt. Findlay. Cross-country flights were carried out to High Post, Eastleigh, Portsmouth, Manston, Leicester and Cowes. The sales department have now a large number of second-hand machines for disposal, all with long C. of A's.; the Brooklands shop is also available for all kinds of flying kits, where prices are quite reasonable, and the advice of experienced pilots thrown in.

YORKSHIRE AEROPLANE CLUB

During the week about 10 hr. were flown on Club aircraft, including a flight to Stockton and return. A total of 73 hr. 30 min. was reached in October, which is an increase on the time for October last year. New members are Messrs. R. T. Eggleton of Harrogate and V. Heaton of Leeds.

NORFOLK AND NORWICH AERO CLUB

Three hundred guests attended the Annual Ball of the Norfolk and Norwich Aero Club, which was held on Friday, November 3. Three large models of the Club's aircraft were suspended in formation from the roof, and the whole was given a further aeronautical effect by various props. being hung on the walls. Among those present were the Lord Mayor of Norwich, Alderman Henry N.

Holmes, who had been President of the Club since its inauguration in 1927, the Lady Mayoress, the Sheriff of Norwich and Mrs. B. J. Hanley, Capt. S. H. Van Neck, M.C., the Chief Constable of Norfolk, Wing Com. and Mrs. R. Collishaw. Dancing continued until 1 a.m. to Fred Anderson's Park Lane Band. Parties were brought by the High Sheriff, Capt. Dawson Paul, Mrs. Kwantes, Mrs. A. W. Sellex, Mrs. J. D. McKelvie, the Misses Bagge, Capt. W. A. Ramsay, Messrs. Geoffrey Holmes, Peter Finch, and R. O. Bond. Capt. and Mrs. A. M. Diamant, Flt. Lt. G. F. J. Fogarty, Mr. R. R. Bentley, and Mr. Kenneth Whittome all flew to Norwich for the Ball.

LANCASHIRE AERO CLUB

Two good performances have been put up at the Club lately. Mr. Peter Brothers, aged 16, went solo after only 6 hr. 20 min. dual, and Mr. R. S. Horrox, who did the necessary solo and tests for an "A" licence in one day. Visitors to the Club included Mr. Will Hay, the comedian, and Mr. Shepherd, the inventor of the "studless" shirt. On Saturday, November 4, a very successful Guy Fawkes Party and Fancy Dress Dance was held at the Club. Casualties were, two coats burned and one skull dented.

HANWORTH (N.F.S.)

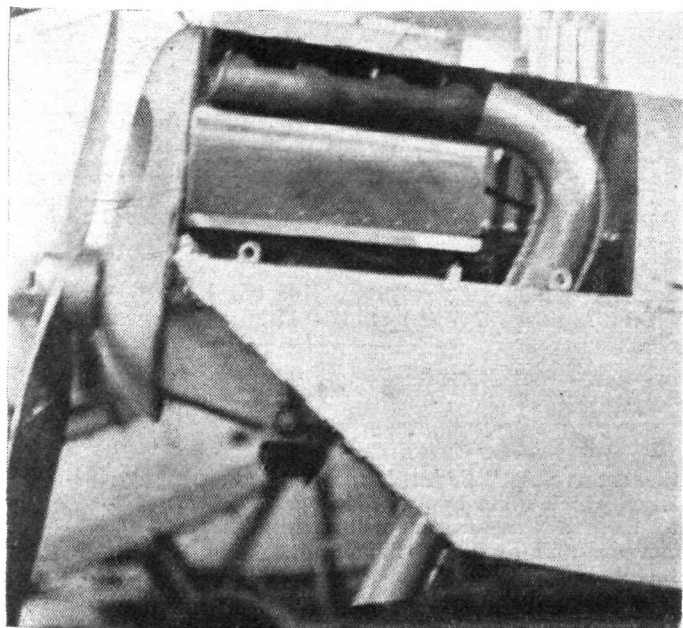
On Tuesday, October 31, Mr. Back flew to Hendon and Croydon to carry out his tests for a "B" licence. Cross-country flights were done by Mr. Bramson from the Isle of Wight, Mr. Shahi to Broxbourne, and Mr. Uebele, who continued his cross-country dual. On Sunday, October 29, Mr. Lauderdale had a trial flight of 30 min. The Insurance Flying Club have been very busy, and during the same day did 4 hr. flying. The Airspeed "Courier," which is housed at Hanworth, has been doing a good deal of flying, including many flights abroad. Members are reminded that tables should be booked early for the Dinner Dance at Hanworth on Friday, November 10.

BENGAL FLYING CLUB

The Club closed down on September 24 for the Pujah Holidays. During the last week of operation the aerodrome was very wet, and so not much flying was done. Mr. Morgan started instruction on September 12, and several other new members have joined during the month. Three machines did a cross-country flight to Asansol and return, the pilots being Messrs. W. Dougall, C. G. Pountney, and J. W. Ross. The passengers were Messrs. B. N. Bhattacharjee, Baron, and Taylor. The flying times for the month totalled 29 hr. 40 min. dual and 125 hr. solo. The Club has four D.H. 60M. "Moths" in commission. Four machines of the Trans-Continental Airways landed at Dum Dum aerodrome, and four left for Karachi; five inward and four outward K.L.M. machines passed through, and four inward and four outward French mail machines passed through.

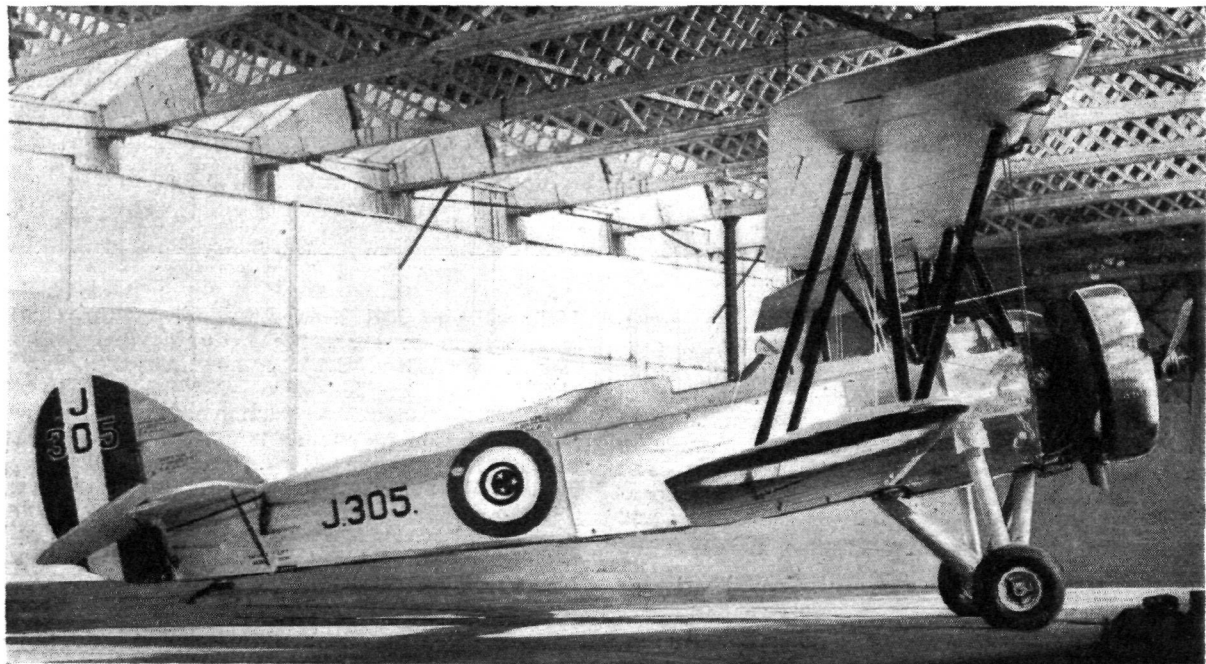
LONDON GLIDING CLUB

On Sunday, November 5, there was elementary instruction in the "Dickson," with longer hops for more advanced members in the R.F.D. The main hill was used in the afternoon, the windless conditions being made interesting by some spot landing in a marked area 30 yd. square. A "B" pilot flew the R.F.D. into a hedge, and smashed a wing up without damage to himself. On one occasion the "Prüfling" landed with her nose on the central spot, while the *Crested Wren* described two circles round the area during her 250-ft. descent, landing inside as required. These attempts at accurate landing are part and parcel of a sustained striving towards good pilotage, so that efficient use may be made of soaring conditions whenever they arise.



FOR LESS NOISE: This is the latest modification to the exhaust arrangements on the Miles "Hawk," as fitted to the machine of that make owned by Mrs. MacDonald. (FLIGHT Photo.)

A WISE CHOICE



FOR EGYPT: This Avro 626 (Armstrong-Siddeley "Cheetah") is one of the batch of machines which have been sold through Airwork, Ltd., to the Egyptian Government for training and general reconnaissance work in Egypt. They are being taken over by Government representatives at Lympne Aerodrome shortly, where a number of Egyptian officers are undergoing training. (Flight Photo.)

AS we have announced on several occasions during the last few weeks, the Egyptian Government are taking over a batch of Avro 626's which their own pilots are going to fly home from Lympne shortly. Several of these machines have already been sent to that aerodrome, and this week we are able to illustrate one of these taken in the hangar at Woodford before its delivery. Being such an adaptable machine, it should be a very wise choice. It will be possible to use it for every kind of flying training, as our past descriptions of the type have explained, while it will also be perfectly good

for scouting purposes in connection with stamping out the illicit drug trade against which the Egyptian Government are now waging an unceasing war.

The model they are having is fitted with the Armstrong Siddeley "Cheetah" engine of 277 h.p., and has, therefore, a better performance than that with the "Lynx IVc." This is clearly shown in the table below. The construction follows the, now well-known, Avro lines, with a welded steel tube fuselage and metal wings with steel spars and aluminium ribs. The undercarriage is very robust and has Bendix wheel brakes.

AVRO TRAINING AEROPLANE, TYPE 626

Armstrong Siddeley "Cheetah" V

277 h.p. at 2,100 r.p.m.

Performance at 2,667 lb. (1 209,7 kg.) Weight
(Landplane, fitted for flying instruction)

<i>Speed</i>	
Maximum speed at sea level	130 m.p.h. (209,2 km.p.h.)
Maximum speed at 5,000 ft. (1 524 m.)	126 " (202,8 ")
Maximum speed at 10,000 ft. (3 048 m.)	121 " (194,7 ")
Landing speed	52 " (83,7 ")
Cruising speed at 1,000 ft. (3 048 m.)	108 " (173,8 ")
Range at cruising speed	2 hours.

<i>Climb</i>	
Rate of climb at sea level	1,000 ft./min. (5,08 m./sec.)
Time to 5,000 ft. (1 524 m.)	5.8 min.
Time to 10,000 ft. (3 048 m.)	14.3 min.
Service ceiling	16,800 ft.
Wing loading	8.9 lb./sq. ft. (43,45 kg./sq. m.)
Engine loading	9.6 lb./h.p. (4,3 kg./h.p.)

<i>Weights</i>	
Tare weight of landplane equipped for dual-control flying instruction	2,010 lb. (911,7 kg.)
Useful load:	
Pilot with parachute	190 lb. (86,2 kg.)
Pupil with parachute	190 " (86,2 ")
Petrol (31 gall.) (140.9 lit.)	239 " (108,4 ")
Oil (3.9 gall.) (17.7 lit.)	38 " (17,2 ")
	657 lb. (298 kg.)
Total loaded weight for flying instruction	2,667 lb. (1 209,7 kg.)

The New Cabin "Cadet"

IN FLIGHT for July 13 of this year we were able to make the first announcement that A. V. Roe, Ltd., were producing a cabin version of their well-known aeroplane the "Cadet." Progress has been slow on this type, as the company were not only very busy on other types, but also wished to make quite certain that there would be no need for any radical alterations to it once they have placed it on the market. Now, however, the first production model is flying, and has proved itself to be a most fascinating machine. We found it as easy to fly as

the open club "Cadet," and possessing many characteristics which must appeal to the private owner who wishes to have a three-seater cabin aeroplane out of which he can see and in which he does not feel cooped up. The fuel has been placed in the two upper wing roots, with the result that smoking is allowed in the cabin. As with all Avro products in this country, this machine will be marketed by Henlys, Ltd., of Heston, who expect to have the first demonstrator at that Airport in the near future. We have been asked to refrain from illustrating this machine or giving further details of it for the present, but we hope to be able to do so shortly.



Hawker Fury (Rolls-Royce 'Kestrel' Engine)

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C.F.

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Extracts from letters
are given below.

As Aircraft Manufacturers and Structural Engineers we claim to possess special knowledge for the supply and erection of hangars and aerodrome buildings.



Air Service Training Ltd.



Hillmans Airways.

BOULTON & PAUL LTD.
NORWICH

London Offices :
139, Queen Victoria St., E.C.4.



Coll. of Aer. Eng., Brooklands.

‘The hangar has been exceptionally satisfactory in every way.’

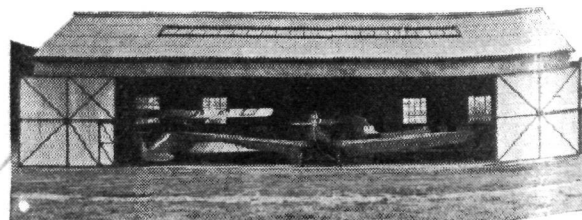
Managing Director, Brooklands Aerodrome.

‘The hangar is entirely satisfactory.’

General Manager, Saunders Roe Ltd

‘The work carried out to our entire satisfaction.’

Proprietor of Hillmans Airways.



Wight Aviation Ltd.

Kindly mention "Flight" when corresponding with advertisers.

Airport News

CROYDON

THE fast D.L.H. machine JU.52, which is now on the night mail service regularly, recently broke the London-Cologne commercial speed record when the 320 miles were flown in 1 hr. 50 min., with pilot Falke at the controls. The very next day the same machine lowered the record again with a time of 1 hr. 48 min. In the first case the average speed for the flight was 174 m.p.h., and for the second day the calculation is an easy one. On Thursday last Herr Kummol, of the German company, completed his millionth kilometre when he landed at the Airport of London. This means some 6,000 hours in the air. Herr Kummol, who is well known at the London Airport, has been 22 years a pilot, and ever since D.L.H. commenced operations he has been on the London route.

The other day a small boy of about nine or ten years of age, in a school cap, invaded the airport with a photograph of a "Heracles," on which he insisted on obtaining the signature of everybody in uniform he encountered. In this way he accumulated signatures of pilots of all nations, several stewards, a sprinkling of junior freight clerks, and, it is said, the hotel hall porter and a passing R.A.F. officer.

People are too accustomed to the ease and regularity with which they can reach places two or three hundred miles away in a couple of hours or so to show any enthusiasm for normal air travel. Every now and then, however, some incident of an unusual nature underlines the outstanding advantages of flying. Take the following flight, for example. It broke no records and there was nothing especially outstanding about it—but it rang the bell. Last Wednesday a man missed the 11 a.m. boat train from Victoria Station to the South of France. He then did what a wiser man might have done at first. He dropped in at the Imperial Airways office on the station and placed himself in the company's capable hands. By 12.30 p.m. he was in the air piloted by Mr. Gordon P. Olley, and he arrived via St. Inglevert Aerodrome at Calais before 1.30 p.m. At St. Inglevert Aerodrome a motor-car was awaiting him. He was puzzled by this for the moment, but afterwards found out that it had been

ordered by his pilot by wireless from the air. This passenger was thus enabled to keep a business appointment of the utmost importance. He had one grouse, however. At Calais he had to wait nearly an hour for the train he had missed at Victoria to link up with the train which was to take him farther. His feeling of superiority over the already jaded passengers from London can well be imagined when, eventually, he saw them arrive.

Three important shipping representatives, Sir G. McLaren-Brown, Canadian-Pacific; Mr. A. B. Cauty, White Star; and Mr. S. J. Lister, Cunard, met on neutral ground when they embarked together by Imperial Airways, Ltd., for Paris, one day during the week. They were to attend a conference of various interested companies of different nationalities on the North Atlantic route, the object being to stabilise fares and rates on that route.

The Royal Dutch Air Lines, by no means one of the least progressive air companies, has recently taken a medical officer, Dr. Slotboom, into the company's service. He arrived at the London Airport a few days ago, where he had an interview with Dr. Draper, of the London Airport. There can be no doubt that in many matters connected with commercial aviation, especially in questions concerning Far Eastern routes, expert medical assistance and advice may be of incalculable value to an air traffic company.

Mr. H. Shaw, Air Representative, Shell Head Office, who left Croydon on October 23, is keeping schedule comfortably. I understand, in spite of misleading weather reports, a 15-m.p.h. tail wind turned out to be a 25-m.p.h. head wind on the way to Tunis, causing him to make a highly successful night landing at that place by the light of the Shell representative's car headlights. Mr. Shaw was at Tunis on October 23, at Cairo on November 1 and reached Baghdad on November 5.

On Saturday, November 4, Imperial Airways, Ltd., were obliged to duplicate the midday service to Paris from here. Both machines were fully loaded. Time was when it was a matter for high jubilation when one small aeroplane could be placarded "full up" in the month of November.

A. VIATOR.

FROM HESTON

ON Thursday, November 2, the two "Dragons" which Indian National Airways have purchased through Airwork, Ltd., of Heston, left for India.

Viscount Ratendone, the only son of the Earl of Willingdon, the Viceroy of India, is travelling on one of them to join his father. The machines, piloted by Flt. Lt. C. E. F. Arthur and F/O. A. G. M. Cary, are travelling via Marseilles, Rome, Tunis, Cairo, Baghdad, Bushire and Karachi to Calcutta. One is fitted with wireless, which may be transferred to the other in a few minutes. They will operate between Calcutta and Rangoon, and between Calcutta and Dacca.

Capt. G. W. Ferguson, navigational instructor at Heston, carries out all ground tuition with a dummy "cockpit" fitted with stick, rudder-bar and compass, and special dummy instruments manufactured by Smiths' Aircraft Instruments, Ltd., the pointers of which are controlled by the instructor. "Turning error" is imparted

to the compass by an electro-magnet operated by a lever out of sight of the pupil. Having worked out his course on a table, the pupil climbs into the cockpit and "takes off." Setting the verge-ring of his compass, he turns on to his course, the instructor swivelling him round with one hand and imparting the correct turning error with the other. Then the map is studied, while the instructor, working the pointers of the instruments, supplies all the little distractions which bother the beginner on his first cross-country flight. All this instruction is given free of charge in proportion to the actual flying done. A pupil going solo in the average 7 hours has already had 3½ hours' ground navigation instruction.

October showed an increase in school hours of 129 per cent. on October last year, despite the low clouds and high winds which predominated. In the first four days of November the hours recorded are over half the total hours for the whole of November, 1932.



Up and Up and Up

SOME indication of the conditions with which pilots have to contend is given by the details of flight in an Imperial Airways *Atalanta* (four A.S. "Serval" engines) in South Africa. A machine of this type was flying not long ago in the region of the Hex River Mountains, where vertical air currents of large magnitude are known to exist. Usually these take the form of very severe gusts, which can stress the aircraft structure heavily and, therefore, call for careful handling on the part of the pilot.

On this occasion, however, something quite different happened. The machine was flying along comfortably when the pilot found himself climbing rapidly. He throttled back the engines and put the nose well down, but still she went up, not at such a rate that the passengers were in anyway inconvenienced, but, nevertheless, up! In a very short time the machine, which was flying at an altitude of 4,000 ft., was up to 14,800 ft., and it was not until this figure was reached that the pilot was able to come down without diving at an abnormally steep angle.

Airisms from the Four Winds

Mussolini's New Post

Two Italian Cabinet changes were announced last Monday. Air Marshal Balbo resigned the post of Air Minister and was appointed Governor of Libya, Italy's North African possession, and Admiral Sirianni resigned the post of Minister of Marine and was appointed President of an important iron and steel company in Piedmont. Signor Mussolini took over both these posts, so that he now holds seven out of the fourteen Cabinet portfolios. By taking over the Ministries of War, Air and Marine, he has not only carried out his plan for the unity of command in national defence, but has reminded all great Fascists that they are all the time servants of the State and himself the sole arbiter of their career.

The Lindberghs' Movements

COL. LINDBERGH and his wife flew from Paris to Amsterdam on Friday, November 3, and later went on to The Hague. While there Col. Lindbergh is reported to have had a conference with the managers of the Royal Dutch Air Lines to discuss the possibilities of a northern air route between America and Europe, which would be in operation during the summer months. After the conference Col. Lindbergh visited the airports of Rotterdam and Amsterdam and inspected the new machines of the Dutch East Indies Line.

That Australian Urge

WE hear that Miss Marsinah Neison is planning a solo flight to Australia with a view to lowering Mr. Ulm's record of 6½ days. Her machine would be one of the newer types of light airplanes with a cruising speed of 130 m.p.h. Unless she gets away soon it looks as if she may be beaten to it by a well-known pilot who has already held the record and now feels the urge to do so again. We understand that she plans to leave in April next year, and that she is hoping to use a Comper "Mouse" ("Gipsy Major") for the flight.

A Well-Earned Rest

THE *Graf Zeppelin* reached her base at Friedrichshafen on Tuesday, October 31, after her "jubilee" trip

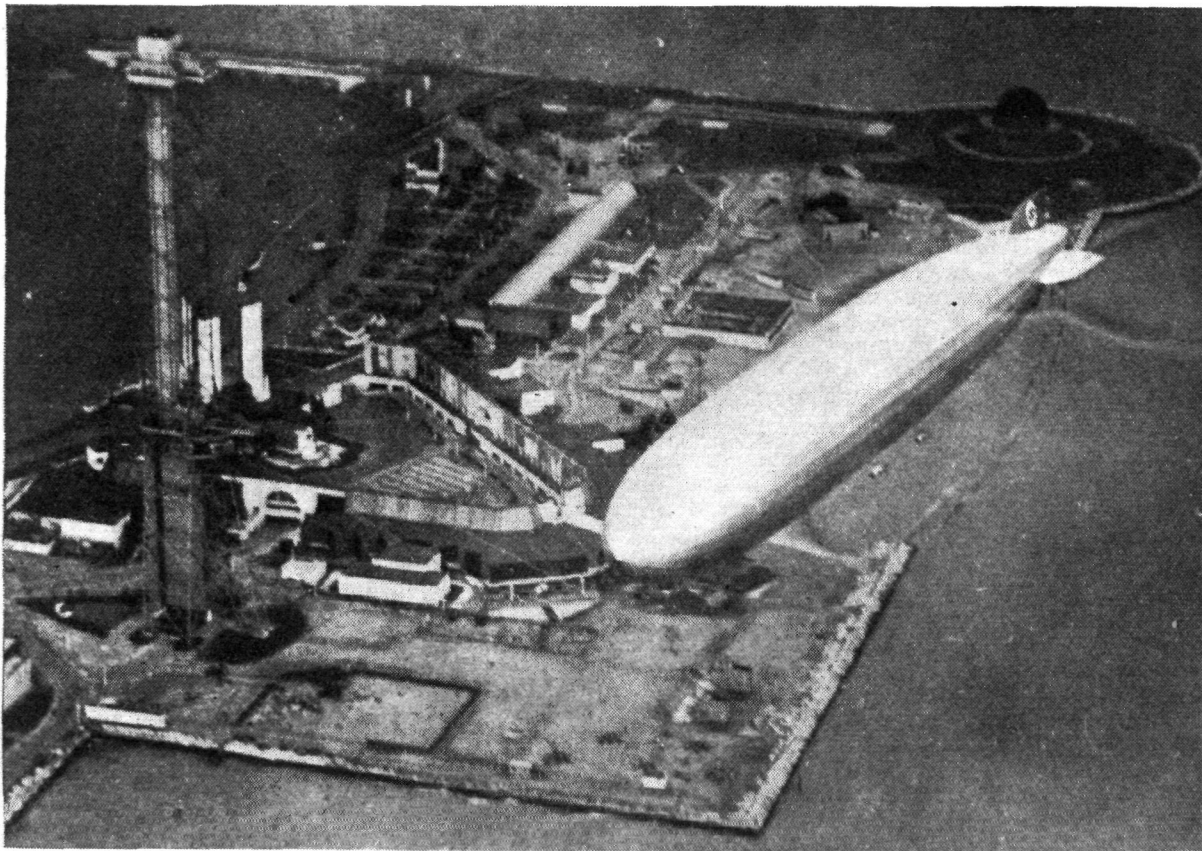
to South and North America. This journey is to be her last this year. Gen. Goering, the Minister for Air, has sent a message of congratulation to Dr. Eckener.

A Soviet Airship Fleet

THE first really large Soviet airship, named *Klim Voroshiloff*, is being completed at the Dolgoprudnaya base, near Moscow. It is intended that the craft will be ready this month for the sixteenth anniversary of the Bolshevik Revolution. Construction is being supervised by Gen. Nobile. Of the semi-rigid type, the *Klim Voroshiloff* will have a capacity of 22,000 cub. metres. She will be 341 ft. long and have a diameter of 82 ft. Sixteen passengers and a cargo of 100 kilogrammes will be carried at a speed of 100 km. per hr. A second airship of 55,000 cub. metres capacity, with a length of 491 ft., will be completed by the spring. According to the Soviet programme of airship construction, seven dirigibles will be built. These will be given the following names:—"Lenin," "Klim Voroshiloff," "Pravda," "Kolchoznik," "Stary Bolshevik," "Konisomolez" and "Profintern." It is interesting to note that the last name means "International Trade Unions." The four small dirigibles already built, with which the Soviet Government is highly satisfied, will be used to train crews for these new airships.

Capt. C. D. Barnard for India

CAPT. C. D. BARNARD, who, it will be recollected, flew the Duchess of Bedford from England to Karachi and back in a Fokker in eight days in August, 1929, has recently organised a flying circus which he is taking to India. He himself will be flying out his Fokker (Bristol "Jupiter XIa"), the *Spider*, as it is now known, and is leaving on Saturday, November 11. With him will go Mr. R. L. Palmer and Mr. J. B. Pugh, both on "Fox Moths" ("Gipsy Majors"). The rest of the pilots will follow by boat, arriving at Bombay on December 8. They will be Messrs. J. Mackay, E. R. Andrews, W. A. Burnside, and J. R. Hatchett, flying a "Tiger Moth" ("Gipsy Major"), Spartan three-seater ("Hermes IV"), Segrave "Meteor" (two "Gipsy III"), and a "Fox Moth" ("Gipsy Major") respectively. From Bombay the whole



A GERMAN VISITOR TO THE CENTURY OF PROGRESS, CHICAGO: Just as descriptive as any of the exhibits at the Century of Progress Exposition, of the advance of science and industry, was the visitor from Germany, the *Graf Zeppelin*, that on October 27 flew over the fair grounds at Chicago. It was the fifth visit of the airship to these shores.



ON CIVIL (AIR) SERVICE: The above Westland "Wapiti" ("Jupiter 8.F") with a closed-in back cockpit, faired away to the tail, is used by the Civil Air Board in South Africa.

party will go to Delhi and Calcutta, and before they finish at the end of next April will have visited some 70 towns, where displays will be given and, it is hoped, many thousands of people taken up for flights. Among the attractions of the Display there will be two parachutists, Messrs. C. E. Longmore and R. Wyndham; both will be using Irvin Chutes for their daily display drops. The "Tiger Moth" which Mr. Pugh is flying is fitted for inverted flying, and on this machine aerobatic displays will be given. Mr. A. H. Dalton, of Furlough Cars, Ltd., is Capt. Barnard's partner, and he is already in India with the advance party. A circus like this one demands the attendance of a fairly large ground staff with transport, particularly as it is operating away from England. Considerable material must therefore be carried with them all the time, and for this purpose a fleet of Vauxhall cars and Bedford motor trucks is being taken, while for the fuel and oil for both ground transport and aeroplanes the organisations of Shell and Wakefield are being relied upon.

Mrs. Mollison

A REPORT from New York states that Mrs. Mollison has been ordered a year's holiday from flying by doctors. She recently had two operations, but hopes to join her husband in Bermuda shortly.

Lord Mayor's Show

THE Lord Mayor's Show, which takes place to-day (Thursday), November 9, will include quite a little which flavours of aviation. To start with, the band of His Majesty's Royal Air Force will be included in the procession, and, for the first time, No. 600 City of London Bomber Squadron. Later on in the procession there will be two cars arranged by the City of London Retail Traders' Association; the first will be a reproduction of a City shop of the past, the second car will represent a suggestion of what the city shop of the future is likely to be, and included will be a landing stage on the top for aeroplanes. Still farther along the procession, under the Pageant of Empire Communications, will be two lorries symbolising the Air Mail and the Telephone Services. The air mail exhibit will depict a bird with a letter in its beak flying over the world. An air mail posting box will also be shown for the purpose of display and to direct attention to the blue colouring, as distinct from the red boxes for land mails. Next to these lorries will be a car arranged by Imperial Airways, Ltd. This car will show the extent of the company's services by a display portraying the world with an illustration of the Empire routes. Appropriately enough, the following cars represent the three principal sailing routes of the Peninsula & Orient Steam Navigation Co.

Accident in France

A THREE-ENGINE Farman machine which left Basle during the morning of Tuesday, October 31, crashed in a fog at Etobon, near Belfort. The only passenger, Dr. Sperry, and the wireless operator were killed, and the pilot, M. Lafannechere, and a mechanic were injured. The machine was carrying a quantity of gold for the Bank of England, which was scattered over a distance of several hundred yards, and four chamois for the London Zoo. Two of these animals were killed, one was injured and the fourth escaped into the woods.

The First Aircraft built in Manchukuo

THE MUKDEN AIRCRAFT ARSENAL, maintained by the Manchurian Aviation Co., has succeeded in turning out two

Fokker passenger monoplanes under licence. These are the first aircraft ever built in Manchukuo and constructed almost entirely of local materials with the exception of their engines, which are the Nakajima "Kotobuki" air-cooled engines of 460 h.p. On October 5, the company christened the new aircraft in the presence of Lieut.-General Koiso, Chief of Staff of the Kuantung garrison and many dignitaries at the Mukden aerodrome.

A Japanese Reconnaissance

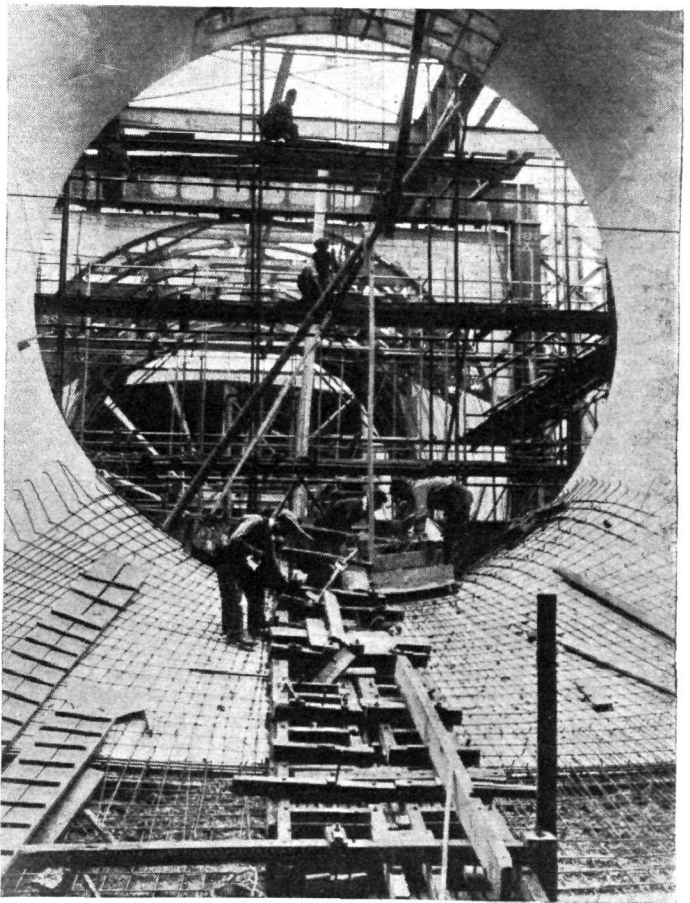
It was reported that nine Japanese military machines penetrated nearly 18 miles into Siberia on Friday. They crossed the Soviet frontier south-west of Vladivostok. The Soviet Government regarded this action with some concern, for, although on previous occasions Soviet territory has been violated by Japanese military machines, they have never flown so far over the border as on this occasion. The Japanese Government, however, have denied the report.

A South Sea Island Aerodrome

It is announced by the Japanese Governor of the South Sea mandated islands that an aerodrome will be constructed on Saipan. The reasons given for this step are that the aerodrome will be of use in the study of atmospheric conditions, the assistance of fisheries and the improvement of communications. Saipan is one of the Marianne group. In 1930 about two-fifths of the population were Japanese.

New German Aircraft Constructors

A NEW company, Bucker-Flugzeugbau, Ltd., has been founded at Johannisthal, Berlin, by Carl Cl. Bucker and Ambi-Budd Presswerk, Ltd. This latter firm specialises in pressed-steel coachwork for cars. C. C. Bucker was owner of the Svenska Aero A.B. works at Stockholm. Under his management this concern turned out a variety of successful types, building both under licence from the Ernst Heinkel Flugzeugwerke and, more recently, to its own designs. The name of Budd, of course, is closely associated with "shot welding," and it seems safe to assume that this process will be used by the new company. We understand that rolled-steel spars will be used in the company's machines, which will be built in the Ambi-Budd factories.



WORKING ON THE NEW WIND TUNNEL: The 24-ft. jet wind tunnel is taking shape at Farnborough. The work is being done by Boulton & Paul, Ltd., and it may be recollected that 2,000-h.p. motors will give an airspeed up to 100 m.p.h. so that the central portion of an aeroplane can be tested at full scale.

NEW BRITISH KLEMMS

THE latest catalogue of the British Klemm Aeroplane Co., Ltd., of Hanworth Aerodrome, Feltham, Middlesex, has just come to hand.

As we have already had the pleasure of announcing, the British Klemm Co. has been formed with Lord Willoughby de Broke as Chairman and Maj. E. F. Stephen as Managing Director. Mr. G. H. Handasyde is work's manager and Mr. H. B. Boulton chief designer. The first fruits of their labours are described in this publication.

Two machines will shortly be ready, each of which embodies the characteristics of the Klemm and retains those flying features which have made them so popular ever since the German-built Klemm was introduced to this country about five years ago.

The smaller of the two is called the "Swallow," and is a British version of the standard two-seater Klemm, being an open low cantilever wing job. Powered with either the 70/75 "British Salmson" or the 80/85 "Pobjoy" engine, it will have a top speed of 100/105 m.p.h. and a landing speed of 37 m.p.h. The gliding angle is estimated to be 1 in 12. The ceiling is 16,000 ft. for the "Salmson" engined machine, with another 1,000 ft. for the "Pobjoy" engined model. The range will be about 400 miles.

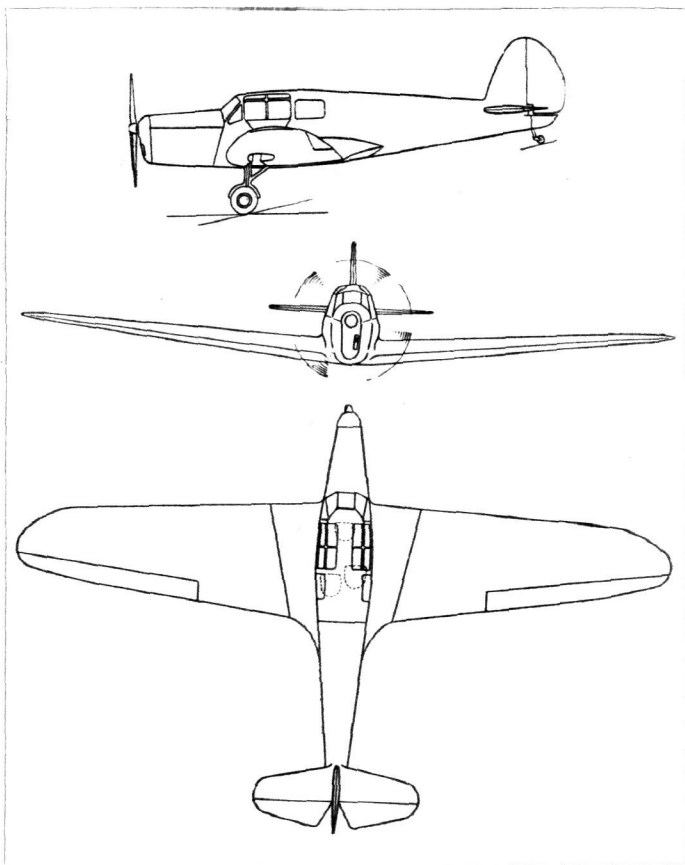
The larger machine is an entirely new type. It has a cabin, seating three persons, and a retractable undercarriage. In general lay-out it follows Klemm practice, and the wheels close up into the cantilever low wing, leaving the underside of the fuselage completely drag-free. The construction is of wood throughout, and all surfaces except the elevators and rudder are plywood covered, these latter having fabric doped over them. The pilot sits in front with the two passengers side by side behind him. Large doors give easy access to the cabin as they open right down to the level of the wings. The controls are operated by the Simmonds-Corsey system, which was described in FLIGHT for February 23, 1933.

The wings are arranged so that folding them is an easy one-man job. Wheel brakes operating independently, one on each wheel are fitted.

"EAGLE" 3-SEATER CABIN WITH RETRACTABLE UNDERCARRIAGE

Provisional Specification and Performance Data.

Specification		
Wing Area	200 sq. ft. (18.6 sq. m.)	Standard Equipment
Span, Overall ..	39 ft. 3 in. (12 m.)	Dual Control, Oil Pressure Gauge, Altimeter, Upholstered Cushions, Compass, Engine Revolution Indicator, Cross Level, Carpet, Petrol Gauge, Air Speed Indicator, Clock, Tool Kit, Navigation Lights (battery extra), Luggage Compartment, with three fibre suit cases, Fire Extinguisher.
Span, Wings folded ..	14 ft. 10 in. (4.52 m.)	
Chord, Maximum ..	6 ft. 6½ in. (2.0 m.)	
Chord, Aerodynamic ..	5 ft. 9 in. (1.74 m.)	
Aspect Ratio	7.75	
Length Overall ..	26 ft. (7.9 m.)	
Height	6 ft. 9 in. (2.05 m.)	
Wheel Track	6 ft. 3 in. (1.90 m.)	
Wheels	Dunlop Disc	
Tyres	Interm., Low Press., 490 x 185	
Brakes	Bendix	



The new British Klemm "Eagle" (Napier "Javelin").

Weights and Performance

Engine	130 h.p. D.H. "Gipsy Major"	155 h.p. Napier "Javelin" (Mark II)
Weight Empty, including all standard equipment	1,200 lb. (545 kg.)	1,362 lb. (620 kg.)
Pilot	160 lb. (73 kg.)	160 lb. (73 kg.)
Petrol	277 lb. (126 kg.)	308 lb. (140 kg.)
Oil	36 gall. (164 lit.)	40 gall. (182 lit.)
	29 lb. (9 kg.)	27 lb. (12 kg.)
	2 gall. (9 lit.)	2½ gall. (12½ lit.)
Pay Load (Passengers and Luggage, or Freight)	443 lb. (202 kg.)	443 lb. (202 kg.)
Weight, Loaded	2,100 lb. (955 kg.)	2,300 lb. (1,047 kg.)
Maximum Speed	148 m.p.h. (236 km.p.h.)	160 m.p.h. (256 km.p.h.)
Cruising Speed	130 m.p.h. (208 km.p.h.)	140 m.p.h. (224 km.p.h.)
Landing Speed	45 m.p.h. (72 km.p.h.)	48 m.p.h. (77 km.p.h.)
Take Off, Normal	120 yd. (110 m.)	120 yd. (110 m.)
Initial Rate of Climb	700 ft./min. (3.55 m./sec.)	900 ft./min. (4.57 m./sec.)
Gliding Angle	1 in 12	1 in 12
Ceiling	16,000 ft. (4,850 m.)	18,500 ft. (5,600 m.)
Petrol Consumption	7 gall./hr. (31.5 lt./hr.)	7.75 gall./hr. (35 lt./hr.)
Flight Duration	5 hr.	5 hr.
Range	650 miles (1,040 km.)	720 miles (1,152 km.)

The Supermarine "Scapa"

APROPOS the recent selection of the Supermarine "Scapa" flying boat as Service equipment, the following notes are of interest. The "Scapa" flying boat (previously known as the Southampton Mark IV) carried out tests in the Mediterranean and Red Seas during June and July. It was flown direct from Malta to Gibraltar on June 7 and returned to Malta on June 10. On June 26 it flew from Malta to Aboukir and continued to Lake Timsah on June 28 and to Port Soudan on June 29. Leaving Port Soudan on July 14, the flying boat proceeded to Lake Timsah, Aboukir (July 15), Sollum (July 19) and Malta (July 20). Continuing the homeward flight, the aircraft flew from Malta to Gibraltar on July 31 and arrived at Felixstowe on August 4.

The Gloster Fighter for the R.A.F.

FROM the recent transference of the Gloster SS 19B to the Air Ministry Open List we deduce that this machine has been selected for issue to a fighter squadron of the R.A.F. The usual procedure when a new type is selected is to equip one squadron as a tentative measure, so that

the type may be thoroughly tried out in squadron work. No name has yet been allotted to this type, but the baptismal ceremony (which is always taken as read) is not likely to be long delayed. The machine was illustrated in FLIGHT of June 22 and 29 last. It belongs to the class known as Day-and-Night Fighters, and has a Bristol "Mercury" engine, fitted with a Townend ring. Great wing rigidity is obtained by making it a two-bay structure, and it goes without saying that the machine handles excellently in all the manoeuvres necessary for a fighter aeroplane.

The Miles "Hawk"

PRODUCTION has been considerably speeded up at Reading in the Phillips & Powis aircraft shops, and the Miles "Hawk" is being turned out at a slightly faster rate than one a week. New machines which have recently been registered are those of Mr. G. J. Armstrong-Jones, Sub. Lt. P. A. Bembridge, R.N., Mr. E. D. Spratt, Mr. S. B. Cliff, this latter being a special model with inverted engine and cabin top; there are also two other machines which have not yet been allocated to purchasers.

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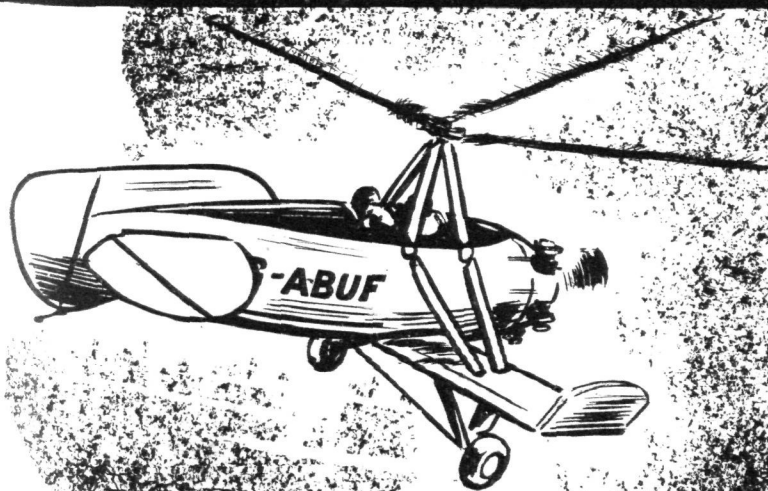
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ON SELLING AIRCRAFT

MR. C. R. FAIREY, whose success in manufacturing and selling aircraft is one of the outstanding achievements in the growth of our aircraft industry, spoke before a large gathering at the Royal Aero Club on Wednesday, November 1. His speech could hardly be called an informative one if considered as a lecture on the art of selling aeroplanes. It was, however, full of trenchant and well-balanced criticism of present-day methods and was, of course, delivered in that forceful style for which Mr. Fairey is well renowned.

He started with a somewhat impassioned plea against aircraft manufacturers like himself being so often called arms racketeers and similar things. He also did his best to expose what he called a canard when he refuted entirely the suggestion so prevalent that British aircraft manufacturers invariably endeavour to ram down their unfortunate buyers' throats, the machines which they consider good for them, instead of building the types which they want. Despite their methods, however, he pointed out that Britain was the biggest exporter of aircraft and aircraft engines in the world, and despite the fact that exports in general had decreased very considerably during the last three years, exports in aircraft had maintained a steady level. He referred to the position in the Dominions, from whence came the bitterest criticism of English selling methods. Despite the varied types of aircraft offered them by our manufacturers, they persisted in buying the standardised products of the U.S. He felt that the trouble was that they themselves did not know what they wanted.

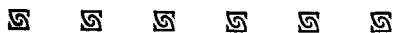
Becoming somewhat more cheerful, Mr. Fairey spent a few moments encouraging people by reminding them of the respect with which English goods were treated abroad and how they were almost always considered to be superior just because they were English; in fact, in Brazil, he said, the people there swear by the Englishman's truth instead of using religious or other oaths of fidelity. He deprecated the fact that aircraft manufacturers' exports were mostly military. He put this down not only to the fact that we as a country produce the finest military aircraft in the world, but to the system of Government orders and assistance which has enabled these aircraft to be developed. He asked that the same assistance be given to the production of civil aircraft so as to enable our manufacturers to compete in the world's markets. He referred to the conditions in the U.S., where the wide open spaces engendered a demand for civil aircraft, and to the very substantial Government assistance given the American

operator in the form of air mail contracts. He pointed out that conditions for flying were in many respects similar to those in the Dominions, and therefore he felt that this was a very strong reason why the authorities should assist in developing our civil aircraft.

Mr. Fairey agreed entirely with the policy of supporting the trade journals which have done so much for the British aircraft industry abroad, but he was very decidedly against what he called stunt publicity, raised by the type of person who expected manufacturers to back them when they wanted to make some spectacular flight. At the same time, he pointed out that there was one type of spectacular publicity with which he was in agreement, and that was the attainment of world's records. These were too expensive for individual effort, and he therefore felt that the Government should co-operate in getting back the three main air records. He was not one of those who ran down the Government on all occasions; in fact, he admitted to having received great assistance from the Air Ministry. He pointed to the removal of the embargo on the machines on the secret list, and said that this has meant greatly increased exports and had made us good friends with our Allies abroad. He felt that the Air Ministry purchasing system had in the past greatly stimulated our trade, but he felt that the policy of cutting down prices which was now becoming rather evident was to be deplored, as it would mean losing our technical supremacy which had enabled us to remain paramount throughout the world. Lowering the prices would mean that technical matters would be superseded by commercial considerations, with the ultimate result that both the Government and the manufacturers would lose, as the policy would destroy that individualism which had placed us on top, and he had no doubt that the entirely open tender system would cheapen production work, but would do so at the expense of technical development and loss of markets, while our manufacturers would no longer be able to supply the R.A.F. with the aircraft it deserved.

Lord Gorell, who was in the chair, expressed a vote of thanks to the speaker, and said that while America would seem to have developed her commercial aircraft more than we had, he did not think she had developed the type of machine suitable for the private owner to the same extent as we had done.

Mr. Adrian Florman thought that the fact that a machine was English was sufficient guarantee in every respect. He thought it was a mistake for the people in the industry not to get together and co-operate.



British Hospitals Air Pageants

FROM the official report (1933) of the British Hospitals Air Pageants, it is evident that the organisation has achieved its object. The report states that between April 8 and October 8 flying took place on every day except four, when the weather conditions were unfavourable. Aerial displays of 20 events each, in many cases two a day, were given in 180 cities and towns in England, Scotland and Wales, and it is estimated that they were watched by over 1,000,000 spectators, of which 800,000 passed through the entrance gates. It is reckoned that the tour has created a great stimulus to aviation. 70,000 members of the public had flights in the 15 machines used. The auditor's certificate shows that as a result of the campaign local hospitals have benefited to the extent of £6,854 6s. 10d. The campaign gave employment to a staff of 108, of whom 102 were absorbed from the ranks of the unemployed. The director, who devoted his whole time to the organisation, received no remuneration, and help of immense value was given by the Hon. Sir Arthur Stanley, the Patrons, the Hospitals' Committees, and the Press. It is claimed that as a result of the campaign 11 orders for new aircraft have been received by various firms. Arrangements are well advanced for next season's campaign, and already certain well-known pilots have signified their intention of accompanying the organisation on its tour. Next year the name of the organisation will be called "The Sky Devils' Air Circus."

"Cirrus Hermes" engines have distinguished themselves during the tour. A Spartan 3-seater ("Hermes IV") operated by Mr. P. Phillips, D.F.C., M.S.M., Proprietor

of the Cornwall Aviation Company, has carried more than 8,000 passengers, made over 4,000 landings and has flown about 36,000 miles without a forced landing. Mr. Phillips bought his Spartan in March this year, and at the end of the tour, in October, his engine hours amounted to 454. The total number of passengers carried was 70,148. About half the joy flights included aerobatics. Miss Pauline Gower's "Hermes" Spartan carried 6,000 passengers during the tour, which entailed flying 320 hours at a cruising speed of approximately 80 m.p.h. Altogether, Miss Gower flew about 25,600 miles. The "Hermes" engine, which was completely overhauled and modified at the beginning of the tour, was not touched except for top overhaul and daily maintenance, and Miss Spicer, who signed it out every day, experienced no trouble whatever.

A Siddeley "Lynx" engine fitted in an Avro aircraft completed six months work in the service of the British Hospitals Air Pageants. During the period it completed some 400 hours running without any top overhaul and even at the conclusion of the tour there were no indications of this being necessary.

Royal Society Medals

HIS MAJESTY THE KING has approved the award, by the President and Council of the Royal Society, of a Royal Medal to Professor G. I. Taylor, F.R.S., for mathematical work in physics, geophysics, and aerodynamics.

Belgian Honour for Lord Wakefield

THE King of the Belgians has promoted Lord Wakefield to the rank of Grand Cross of the Order of Leopold II.

THE 1934 DEUTSCH DE LA MEURTHE CUP

11 Machines Entered

NOTWITHSTANDING the more stringent conditions required of the contestants in order to qualify to take part in next year's Contest, eleven entries were received by the Aero Club of France for the 1934 Deutsch de la Meurthe Cup Race when the time expired on Tuesday evening, October 31 last, for entries at the single fee of 2,000 francs (£25 approximately) per machine. One-half of this fee will be refunded to contestants if their machines start in the race. Entries at the increased fee of 6,000 francs (£75 approximately), one-half of which is to be similarly refunded, will, however, be received up to 6 p.m. on March 15 next.

Entries received to date:—The Henry Potez Aeroplane Co., two machines; the H. & M. Farman Aeroplane Co., one machine; the Rene Caudron Aeroplane Co., three machines; the Emil Regnier Motor Co., one machine; the Royal Aero Club of Italy, three machines; the Royal Aero Club of Great Britain, one machine.

This contest, the primary object of which is to develop the qualities of engines of average cylinder capacity, will again be a speed race, international in character, being open to members of clubs composing the F.A.I. (Federation Aeronautique Internationale). It will be flown on May 27 next over a distance of 2,000 km. (1,243 miles), covering a closed circuit of 100 or 200 km. (62½ or 125 miles) in length, situated in the la Bauce district, adjacent to Paris.

The start and finish will take place at the Bricy-Orleans Aerodrome if that field, which is now undergoing improvements, can be got ready in time; otherwise at the Etampes-Mondesir airport, the same as this year. The general regulations of the race will be similar to those of this year.

The total cylinder capacity of the engine or engines of a machine is limited to 8 litres (488.2 cu. in.). The contestants can use any fuel. The contest will consist of two flights of 1,000 km. (622 miles) each, with a compulsory landing of an hour's duration between them. Any excess

of time over this interval will be counted as flying. Repairs and refuelling during the race are allowed. The pilot must be alone on board, but can be replaced during the contest.

The planes will be sent off from standing start, with their engines turning if desired, at intervals of two minutes. The order of the starting will be determined by drawing lots.

The crankshaft, cylinders and all parts relating to the cylinder capacity must be sealed or stamped by a properly constituted authority of the country from which the contestant is entered. No sealed or stamped parts can be changed during the race. A time limit of 8 hours to cover the course, plus the one hour's time required for the landing between the flights, is imposed on the contestants.

More stringent qualifying requirements have been imposed this year. Every contestant entered in the race must certify that between April 6 and May 7 next he has flown over a closed circuit course 500 km. (310 miles) in length, at a speed of at least 250 km./hr. (155 m.p.h.). This flight is to be accomplished with fuel tanks sealed. The "take-off" must be made within a distance of 550 metres (601.5 yards), and the plane must clear an obstacle composed of two parallel cords, 50 metres (54.7 yards) apart, stretched across the field at a height of 1 metre above the ground. The nearest cord is to be 550 metres (601.5 yards) from the starting point of the plane. The landing must also be accomplished within a distance of 550 metres, the machine being required to clear two similar cords stretched across the field at a height of 1 metre, 50 metres apart, and must come to a stop within 550 metres of the second cord it crosses. These qualifying trials must be accomplished with a wind of less than 6 metres per sec. (13.4 m.p.h.) prevailing.

In addition to winning the Cup, to be held by the Aero Club of his country for one year, the winner of the race will receive a cash prize of 100,000 francs.

R. C. W.



R.Ae.S. Lecture

ON Thursday, November 16, 1933, Mr. H. Roxbee Cox, Ph.D., D.I.C., B.Sc., A.F.R.Ae.S., will deliver his lecture on "Problems involving the Stiffness of Aeroplane Wings," before the Royal Aeronautical Society, at 6.30 p.m., in the Lecture Theatre of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2. The usual method of estimating the strength of an aeroplane structure from stresses induced in it by steady loads under various flight conditions is not sufficient. Account must also be taken of the degree of stiffness of the structure, or resistance to distortion. The safety of an aeroplane may depend upon the stiffness of the structure, indeed. In the lecture the influence of wing stiffness on flutter is discussed, and a method of deciding the degree of stiffness required to prevent wing-aileron flutter is described. Methods of finding the necessary stiffness to prevent undue loss of lateral control and structural instability at high speeds are discussed. The important conclusion is reached that high torsional stiffness is necessary for safety, and particular attention is paid to the problem of the skin-covered wing in this respect. Mr. Roxbee Cox's lecture is of considerable importance, and one which raises indirectly the whole question of present methods of aeroplane design and construction and the safety and stability problems which follow from such forms of design and construction as speeds increase.

Mr. Lee Murray's New Post

MR. LEE MURRAY is shortly leaving England for Canada to take up the position of General Manager of the de Havilland Co. of Canada, Ltd., at Toronto, in succession to Mr. Loader, who is coming back to the parent company after five years in Canada. His many friends in Great Britain will be very glad to see Mr. Loader back, though the departure of Mr. Lee Murray will be equally regretted. Flying interests make the world small, and it is not every day in the week that an Australian goes out to take up an important position in Canada. Mr. Lee Murray comes from Melbourne, where he graduated at the University of that city. He served in the R.A.F. during the war. He has travelled widely, and has flown across India from Peshawar and on to the Dutch East

Indies. He has also flown across the United States and Canada. Recently he and Mr. Shackleton have been in partnership in London as aeronautical consultants, and between them they have designed the S.M.1 pusher light aeroplane, of which there have been several accounts and illustrations in FLIGHT.

Aerial Photography in Mapping

THE value of aerial photography in mapping is very graphically portrayed on the Kenora map sheet now re-issued by the Canadian Topographical Survey, Department of the Interior, on which the hundreds of islands in lakes of the woods are shown. These islands range in size from ten miles or more across to mere rock points jutting from the lake. By ordinary ground methods of survey the task of locating all these islands and crags would involve arduous labour and great expense, but the camera shows them all and methods of plotting largely worked out and perfected by officials of the Department they are now shown in map form.

The Air Ministers in the new French Cabinet

AS was generally anticipated, M. Pierre Cot has been elected as Air Minister in the new Sarraut Cabinet. The Under-Secretary of State for Air is M. Charles Delesalle, whose extensive war experience and wide technical knowledge should be a great help to M. Cot in reorganising French military aviation.

A New Director for the German Aeronautical Association

HERR GERD VON HOEPFNER, Vice-President of the German Aeronautical Association, the German Aero Club and the F.A.I., has resigned from his duties. It is understood that Wolfgang von Gronau, the long-distance pilot, will take his place.

American Instrument Flying School

IN accordance with a recent order from the Chief of the Army Air Corps which states that all pilots are to receive a uniform 10-hr. course in instrument flying, a rigorous programme has been instituted at Chanute Field, Rantoul, Illinois.



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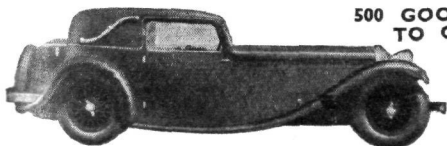
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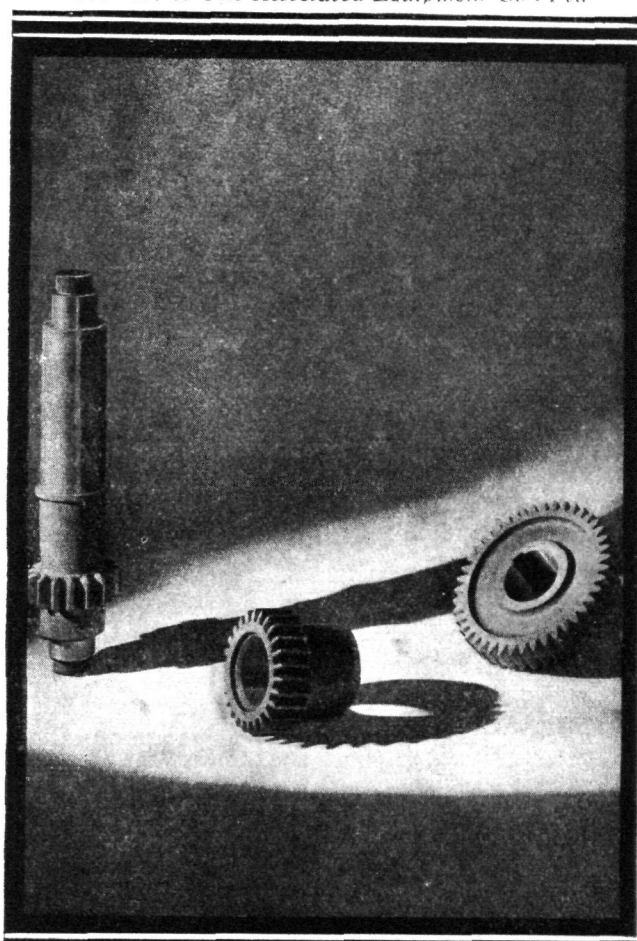
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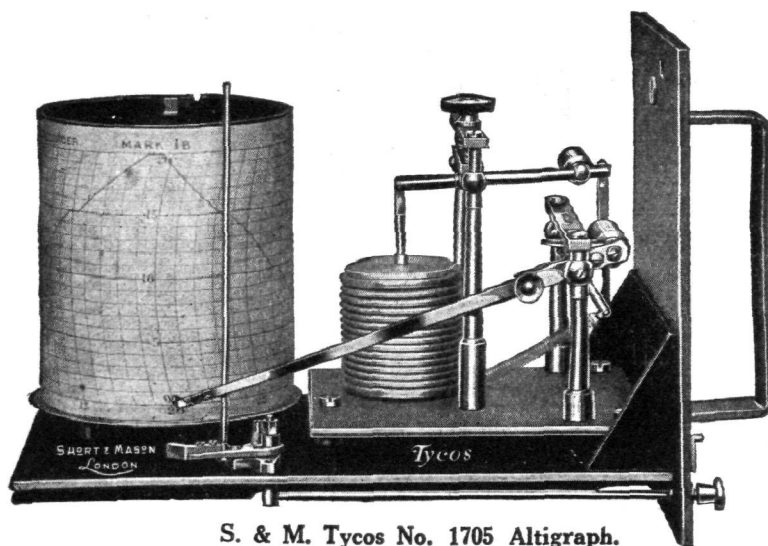
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AIRSHIPS

[2894] The recent unveiling of the memorial to those who lost their lives in the disaster to *R.101* at Beauvais brought to mind recollections of airship construction which it might be well to place on record.

In view of the finding of the Court of Inquiry that the leaking of the gasbags was largely responsible for the disaster, it may be remarked that no one can have helped with the manipulation of one of these semi-inflated gasbags without being impressed with their unmanageability. As the fabric used for the gasbags of *R.100* and *R.101* was a single-ply cotton fabric which could only resist strains parallel to the warp and weft, the gold-beaters skin lining might have been subjected to heavy strains at an angle to those two directions during man-handling.*

The most highly skilled airship hands would naturally have been employed at Cardington, and as *R.100* was finished and commissioned first, much valuable experience would have been gained in the handling of this ship's gasbags. The gasbags of *R.101* may, on this account, have been more skilfully manipulated, and consequently, as shown in the report of the Court of Inquiry into the disaster, very much more gastight before a flight than those of *R.100*.

In any case, there must be a limit to the size of the gasbag which can be constructed in this way, hence to the diameter of a ship of circular section, and it is worth inquiring how nearly this limit was reached in the case of these two ships.

Engineers naturally regard the framework of a rigid airship as its "structure"; but if the outer cover could be made stiff and light enough to resist the stresses on a ship in flight in any way—other than by using gold-beaters skin—at the same or less cost the framework might be dispensed with. The right way to regard the matter being that the framework is a reinforcement of the outer cover, the structure of the envelope being the combination of the two, an airship only being a success when the reinforced envelope and enclosed gasbags fit together harmoniously without friction in flight.

Beckington, Bath.

F. D. REYNOLDS.

November 3, 1933.

* Cf. Letter to the Editor, "Engineering," 27.10.33.

PIONEERS OF FLYING

[2895] How unkind it will be, as Mr. J. L. R. Waplington says, if the discussion under the heading "The Pioneers of Flying" continues along the lines of Mrs. Greenwood's and Mr. Waplington's letters, in which the names of well-known aviators are bandied about in a most unseemly context! There is much to be admired in the spirit of adventure, the determination and feats of endurance by which records from "here to there" are broken. It is a point, however, that some achieve a pioneering or record-breaking flight without even a little rather vulgar ostentation—and some, unfortunately, don't.

Roundhay, Leeds.

L. V. FOSTER.

November 6, 1933.

[This correspondence is now closed.—Ed.]

REGULATION OF CIVIL FLYING

[2896] Many people appear to think that Maj. Mealing was looking far too much ahead when he made his recent statement about the safety of aviation. Without claiming to be an authority on the matter, it is quite clear to me that the general public

are very far behindhand with their education in everything connected with aerial traffic, and this does not reflect great credit on transport operators, such as myself! I am well aware of the increasing importance of proper control, even within the limits of my own sphere of activity; the traffic returns speak for themselves in that respect, and the increase has all taken place during the period of the greatest financial depression the world has ever known.

It needs no stretch of imagination to foresee even the provincial aerodromes, in which I am mainly interested, becoming overcrowded, and difficult to control, within a very short time, although two of those aerodromes were recently mentioned as unnecessarily large. The real reason that a crisis has not already arrived in respect of control is more due to the general financial condition of the country, together with the great cost of maintaining aircraft, than to any fears on the part of the public about their personal safety in the machines.

A great many people, to my knowledge, appear to think that an aeroplane can, and should, be able to do anything that is at all difficult for any other form of transport to do, do it better and quicker, and much cheaper! Also, nearly every man, and certainly every boy, believes he is capable of being a first-class pilot within a week or two, and is unfairly treated in the matter of opportunity to learn a simple trade!

In view of the above, two factors would cause an immediate vast increase in general flying: (1) A better financial outlook, and (2) the production of a really cheap and safe aeroplane, at a price which would allow any motor owner to consider buying an aeroplane for sport alone.

The very first essentials for safety, and an increase of traffic, appears to be the provision of many more aerodromes, and the greatest danger of a large increase of traffic lies, of course, in the concentration of much traffic into one small area, or all traffic being limited to a very few small areas on which to land.

From the provision of ample landing grounds to general control, and from general control to local sub-control, is not nearly so difficult as attempting to control masses of traffic in the air, all being obliged to concentrate upon a very few small areas.

The position is approximate to a town with only one garage, or several towns with only one garage. However good the local arrangements may be, a very large increase of traffic is a serious embarrassment, because of the approaches to the place, quite as much, or possibly more so, than lack of space on the spot.

When liners and private machines each have their own special aerodromes in the same locality, and are only permitted to use their own lines of approach and take-off, the local control may be depended upon to make the actual landing ground as safe as possible, and a course and height indicator, transmitted by wireless, may be made to perform something of the same function as a fog horn at sea, in cases where ships are lost in fog or darkness, but under no circumstances must it be imagined that the private owner is to be excluded; far from it.

What we want to see is the whole sky packed with aircraft, all coming in and going out in perfect safety, from all over the world, and Britain's controls the best and most efficient.

We will see this, too; and the sooner the better, for the aeroplane's proper function is to build up the broken trade of the world and goodwill between all nations.

THENE-EE.

Ryde, I.O.W.

November 5, 1933.

Aerodrome v. Tennis Court

A WELL-KNOWN authority on matters of aviation was visiting a certain Town Clerk in order to discover why that official was opposed to the establishment of a municipal aerodrome in the vicinity of his town. He was told that, on the authority of a relation who was in a Government department, all aeroplanes would, inside two years' time, land on and take off from tennis courts. "Now,

I ask you," he said, "how can I recommend my Council to spend a lot of money on this aerodrome, as you suggest, when we already have four tennis courts right in the centre of the town"! We are glad to say that a few queries about parking facilities and an explanation as to the true facts of the case enabled yet another convert, to the eminently sensible doctrine of an aerodrome for every town of any consequence, to be made.

The Industry

NEW PLUG DETACHER

A NEW double-purpose quick detacher, combining in one tool all that is necessary for the removal and dismantling of a plug, has been designed by the K.L.G. Co., of Putney Vale. This tool comprises an ordinary box spanner, with one end of suitable size for removing a plug from the engine, and the other of a size to fit the gland nut of the plug. Welded around this latter end is a steel disc with a ring of eight equally-spaced holes near to its outside edge. On top of this disc is mounted a second disc with a hexagonal hole in its centre to accommodate the hexagonal nut of the plug body. It is also free to rotate on the spanner. This disc is also perforated. Thus there are two discs, one above the other, one fixed the other free, both perforated with holes. When the plug has been inserted in the box spanner, the gland nut of the plug engages with the hexagonal hole within the mouth of the tool, and the hexagon nut of the plug body fits the hexagonal hole in the movable disc. The gland nut can now be unscrewed by the tommy bar, using the holes as a means of leverage. The vernier arrangement of the holes ensures that one pair must always be in the right relative position for obtaining this leverage.

ALUMINISING

COATING with metal by spraying is not an untried process, and as far back as November 22, 1929, we described the method in which this was carried out. Since that time many improvements have been devised, and Metallisation, Ltd., of Pear Tree Lane, Dudley, now spray aluminium for many aviation uses. One of the most important is the protection of exhaust pipes and manifolds. For this purpose the aluminium is sprayed on by a "pistol." The aluminium wire which passes through this pistol is fused by a gas blow pipe flame, which in turn is surrounded by a cone of compressed air. The resulting fine spray of molten metal adheres to the surface of the article being sprayed, when that has been roughened, as is the case when the manifolds have been sandblasted to give a coarse open structure to the steel, and then inspected to ensure that every particle of scale has been

removed. After being sprayed they are heat treated at temperatures above 750 deg. C., and during this treatment the aluminium alloys with the steel, forming a coating composed of a gradation of iron-aluminium alloys. As these alloys are easily oxidisable they become covered with a film of alumina which is one of the best protections known against heat. Where necessary the inside of exhaust pipes can also be treated by means of an extension nozzle on the pistol.

Exhaust systems have been protected in this way for:—Armstrong-Siddeley's, Hawker's, Pobjoy's, Rolls-Royce, Supermarine's, Blackburn's, Spartan's, Westland's and Short's, while Fairey's and Boulton & Paul's have pistons for treating their own products.

The process of spraying can be applied for other purposes than for exhaust pipes, and can be used with other metals than aluminium. Many aero engines have their aluminium alloy castings coated with zinc as a protection against corrosion, and other similar uses are being examined. Wireless sets and magnetoes can also be coated for screening purposes, and the steel parts of aerodrome equipment, as, for example, the floodlights and searchlights, can be made corrosion-prove by coating with zinc.

CELLON AT OLYMPIA

THOSE attending the Motor Transport Exhibition (Olympia) should visit the stand of Cellon, Ltd., which is No. 307 in the Gallery, and make a point of seeing the new "Cerrux" synthetic finishes. These materials, which have synthetic resin for their base, are already being used in very large quantities for aircraft construction. The output for the Cellon works at Kingston reached a record for the post-war period in October this year. Naturally, after the war, when the demand for aircraft dope diminished, the company explored new fields, and the demand for their cellulose lacquers necessitated building new works at Kingston. So great has this demand become that the average output for the last three months has approximately been the same as that for the year 1918, when the demand for aircraft dope was at its highest.



IMMORTALISING THE R.A.F.

TO this day there are people who regard the R.A.F. as a Service not comparable in national importance with the Navy and Army. We would refer these diehards to the Royal United Services Institution, which has constantly endeavoured to make the R.A.F. section of its Museum in every way as comprehensive as the splendid section devoted to the other Services. The title "R.A.F. section" is somewhat misleading. Gifts and loans in any way connected with the development of modern aviation in any of its phases are welcomed by the Museum, although, unhappily, the space available does not permit the exhibition of objects of great bulk.

There are exhibits of great sentimental, historical, and instructional value. The old R.F.C. banner carried at the Commemoration Service held at the Albert Hall in 1917 to the first seven Divisions in France hangs on the wall. An extremely interesting and valuable exhibit is a model depicting the first time an aircraft, in this case a balloon, was used to co-operate with ground forces. The occasion was the Battle of Fleurus, fought about 150 years ago. Zeppelin relics form quite a large collection. We hope, however, that these will not increase to undue proportions.

The collection of models is steadily growing. The majority of these are presented by the manufacturers of the prototypes. The Secretary tells us that a model of a modern heavy bombing type is urgently required. The Handley Page "Heyford" would look most impressive. Such modern machines as the S.6B, "Hart," "Fury," "Vildebeest" and "Atlas II" are represented, and (is this prophetic?) an "Autogiro" model is shown among a group of Army Co-operation types. This machine, of course, was extensively used during the recent Army manoeuvres. In the Naval section there is a model of

the complete Fleet at Jutland. Tucked away in the midst of squadrons of battleships, battle cruisers, cruisers and flotillas of destroyers is the old seaplane carrier *Engadine*. Close at hand is a model of H.M.S. *Courageous*. This is the finest model of its kind that we have ever seen. It is not a huge highly-polished "shipbuilder's" model, but is, we think, about a yard long. So complete is it that even the elevating gear and other gadgets on the H.A. guns are all present, and scale-model Fairey "Flycatchers," 3.F's, and a "Ripon" are ranged on the deck. This model should be studied in conjunction with a large drawing by G. H. Davis showing the ship in cross-section. A model of H.M.S. *Royal Sovereign* carries a "Flycatcher" on "B" turret. The H.M.S. *London* model has a catapult turntable fitted, but soon, in order to bring it up to date, a catapult complete with seaplane will be mounted.

Aircraft armament is represented by twin Vickers drum-fitted guns of post-war design, mounted on a Scarff wind-balanced mounting, and a collection of British and French bombs ranging from the small practice type to a fourteen-hundred pounder, which is ranged against the walls. The delight of small boys is the cockpit of an aeroplane complete with controls and instruments. On moving the controls a small model suspended overhead performs appropriate movements. What cannot be represented by actual exhibits or models is shown by pictures, and some excellent coloured enlargements of FLIGHT photographs. We would sincerely recommend anyone interested in our fighting forces, past or present, to visit the Museum in Whitehall, and would urge those who possess anything of interest which has a connection with the development of military aviation in particular, to see that it is preserved therein.

THE ROYAL AIR FORCE

London Gazette, October 31, 1933

General Duties Branch

The follg. Acting Pilot Officers on probation are confirmed in rank and graded as Pilot Officers (September 23):—G. N. Amison, J. W. Buchanan, J. O. Carter, H. W. Dean, F. H. Dixon, J. C. Evans, P. S. Foss, G. R. Howie, G. O. Llewellyn, T. C. Sanders, E. T. Smith, D. E. Turner, P. N. J. Wilkins. The follg. Acting Pilot Officers on probation are graded as Pilot Officers on probation:—C. F. Newcombe, J. P. Selby (September 16); G. J. I. Clennell, T. B. Morton, J. H. G. Sarll (September 23).

The follg. Pilot Officers are promoted to rank of Flying Officer:—R. Faville (April 10); D. L. Dustin (October 10).

Flt.-Lt. A. D. Macdonald, M.C. (Supplementary List) is promoted to rank of Squadron Leader (October 17); Wing-Com. V. Gaskell-Blackburn, D.S.O., A.F.C., is placed on half-pay list, scale A (October 26); Lt. J. C. Richards, R.N., Flt.-Lt., R.A.F., ceases to be attached to R.A.F. on return to Naval duty (October 19); Flt.-Lt. J. A. MacNab is placed on retired list (October 26); Sqdn.-Ldr. G. S. Reed, O.B.E., relinquishes his short service commn.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain: R. M. Field to Special Duty List, 15.10.33, on appointment as Air Attaché, Paris, vice Group Capt. R. J. Bone, C.B.E., D.S.O.

Wing Commanders: G. E. Livock, D.F.C., A.F.C., to H.Q., Cranwell, 23.10.33, for Air Staff duties, vice Wing Com. W. B. Farrington, D.S.O. F. H. M. Maynard, A.F.C., to Air Ministry, Dept. of Chief of the Air Staff (D.O.S.D.), 23.10.33, for Air Staff duties, vice Group Capt. W. B. Callaway, A.F.C.

Squadron Leader: G. H. Harrison, D.F.C., to H.Q., Central Area, 23.10.33, for Navigation duties.

Flight Lieutenants: P. S. Blockey to Aircraft Depot, Karachi, India, 24.10.33. J. C. Foden, A.F.C., to Aircraft Depot, Hinaidi, Iraq, 29.9.33. E. D. MacL. Hopkins to No. 15 (B.) Sqdn., Martlesham Heath, 23.10.33. H. L. Patch to Air Armament School, Eastchurch, 23.10.33. C. H. Turner to No. 31 (A.C.) Sqdn., Quetta, India, 24.10.33. E. B. Addison to Air Ministry, Dept. of A.M.P., 26.10.33. F. Boston to R.A.F. Depot, Uxbridge, 17.10.33. C. F. C. Coaker to H.Q., Central Area, 27.10.33.

Flying Officers: J. Coverdale to No. 14 (B.) Sqdn., Amman, 14.10.33. A. P. Glenn to R.A.F. Base, Gosport, 16.10.33. J. Y. Humphreys to No. 31 (A.C.) Sqdn., Quetta, India, 24.10.33. E. J. Laine to Superintendent of R.A.F. Reserve, 25.10.33. C. R. Lousada to No. 28 (A.C.) Sqdn., Ambala, India, 24.10.33. W. H. Mitchell to Aircraft Depot, Karachi, India, 24.10.33. M. A. Payn to No. 2 Armoured Car Co., Ramleh, 12.10.33. F. C. Sturgiss to No. 2 (Indian Wing) Station, Risalpur, India, 24.10.33. M. D. C. Biggie to Station Flight, Abingdon, 24.10.33. D. I. P. Macnair to Air Pilotage School, Andover, 25.10.33. D. W. Reid to No. 502 (Ulster) (B.) Sqdn., Aldergrove, 27.10.33.

Pilot Officers: C. F. M. Rambaut to No. 101 (B.) Sqdn., Andover, 11.10.33. F. M. C. Corelli to No. 11 (B.) Sqdn., Risalpur, India, 24.10.33. W. J. Craig to No. 20 (A.C.) Sqdn., Peshawar, India, 24.10.33. C. C. House to Aircraft Depot, Karachi, India, 24.10.33. R. S. Howe to Aircraft Depot, Karachi, India, 24.10.33. A. W. Langton to No. 28 (A.C.) Sqdn., Ambala, India, 24.10.33. W. McA. McAulay to No. 28 (A.C.) Sqdn., Ambala, India, 24.10.33.

Comrades of the Royal Air Forces

OFFICIAL recognition has been given to "The Comrades of the Royal Air Forces," an association whose primary object is to foster a spirit of comradeship among the past and present members of the Air Services. The Association has branches in various parts of the country and its membership is open to all past members of the various flying services and to serving personnel of the Royal Air Force. Its President is Marshal of the Royal Air Force The Lord Trenchard, G.C.B., D.S.O., D.C.L., LL.D. Further particulars as to membership, etc., can be obtained from the Hon. General Secretary, Flt.-Lt. C. E. Cullen, R.A.F. (retired), Azara, Station Estate, Taplow, Bucks.

Electrical and Wireless School, Royal Air Force

OFFICERS' Reunion Dinner is to be held at Royal Air Force Club, 128, Piccadilly, W.1, on Saturday, November 25, 1933. Information from the Honorary Secretary: J. F. Herd, Ditton Corner, Datchet, Slough.

No. 3 Sqdn., R.F.C., and No. 3 (Fighter) Sqdn.—Annual Reunion Dinner

The annual reunion dinner of officers of No. 3 Sqdn. will be held at the Mayfair Hotel, W.1, at 7.30 p.m. for 8 p.m., on Friday, December 1,

on completion of service (October 1); Lt. R. P. Garnett, R.N., F/O., R.A.F., relinquishes his temporary commn. on return to Naval duty (December 3, 1931). (Substituted for *Gazette*, December 15, 1931.)

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

F/O. M. G. Parker is transferred from Class A to Class C (October 10); F/O. H. W. Smith relinquishes his commn. on completion of service (July 28); F/O. W. Allan relinquishes his commn. on completion of service and is permitted to retain his rank (October 7); F/O. H. S. Basford relinquishes his commn. on account of ill-health and is permitted to retain his rank (November 1); F/O. S. H. R. Clarke relinquishes his commn. on account of ill-health (November 1).

Medical Branch

Flt.-Lt. J. D. Driberg, O.B.E., M.C., F.R.C.S., relinquishes his commn. on completion of service (August 20).

W. L. Stedman to Aircraft Depot, Karachi, India, 24.10.33. C. M. Stewart to No. 5 (A.C.) Sqdn., Quetta, India, 24.10.33. E. G. Thompson to No. 31 (A.C.) Sqdn., Quetta, India, 24.10.33.

Stores Branch

Flight Lieutenant: A. H. Allan to H.Q., Central Area, 1.10.33.

Accountant Branch

Squadron Leaders: W. G. W. Prall to H.Q., Western Area, 2.11.33, for Accountant duties, vice Sqd. Ldr. R. Byrne. A. R. Thomas to Central Flying School, Wittering, 29.10.33, for Accountant duties, vice Sqd. Ldr. C. H. Moore.

Flight Lieutenant: R. G. D. Thomas to No. 4 Flying Training School, 9.10.33.

Medical Branch

Wing Commander: R. W. Ryan to Aircraft Park, India, Lahore, 18.10.33.

Squadron Leaders: B. F. Haythornthwaite to H.Q., R.A.F., Aden, 18.10.33, for duty as Deputy Principal Med. Officer (Hygiene). W. J. G. Walker to R.A.F. Gen. Hospital, Hinaidi, Iraq, 18.10.33, for duty as Med. Officer.

Flight Lieutenant: F. B. C. L. B. Crawford to R.A.F. Gen. Hospital, Hinaidi, Iraq, 18.10.33.

Flying Officer: L. M. Corbet to No. 2 (Indian) Wing Station, Risalpur, India, 18.10.33.

Dental Branch

Flight Lieutenant: J. J. Lawson to R.A.F. H.Q., Cranwell, 31.10.33.

Flying Officer: V. H. Weeks to No. 5 Flying Training School, Sealand, 30.10.33.

NAVAL APPOINTMENT

The following appointment has been made by the Admiralty:—

PROMOTION

Lieutenant: A. Brock (Flight Lt., R.A.F.), to rank of Lt. Com. (seniority October 30).

1933. The Chair will be taken by Air Marshal Sir Robert Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C. Tickets 13s. 6d. each, exclusive of wines, may be obtained on application to the Honorary Secretary, Flt.-Lt. A. T. K. Shipwright, D.F.C., No. 3 (Fighter) Sqdn., Royal Air Force, Upavon, Marlborough, Wilts. Owing to overseas postings and changes of address, it has been impossible to notify all past and present members of the squadron of the dinner. Those members who have not received notices should communicate with the Honorary Secretary.

New Chaplain-in-Chief, Royal Air Force

The Air Ministry announces the following appointment:—The Reverend James Rowland Walkey, M.A., to be Chaplain-in-Chief to the Royal Air Force, with effect from December 11, 1933, in succession to the Reverend Sidney Lampard Clarke, M.A., B.Sc., K.H.C., who retires from the Royal Air Force on that date. The Reverend J. R. Walkey graduated at Cambridge University in 1902 and was appointed a Chaplain in the Army in 1912. During the war he served in France with distinction, gaining a "Mention in Despatches," and being promoted Chaplain to the Forces, 3rd Class, for distinguished services in the field. He transferred to the Royal Air Force in 1918, and has been the senior Chaplain at Halton since December, 1930.

Protection of Aeroplanes from Danger Due to Lightning

SINCE 1925, only ten cases of British aeroplanes (Service and civil) having been struck by lightning have been reported, and in no case did serious damage occur. In these cases the following appear to have been the determining circumstances:—(a) Meteorological reports indicated the possibility of thundery conditions. (b) The aircraft flew into or close below the clouds before being struck. (c) Nearly all the aircraft had the wireless aerial trailing. In order to avoid danger the following precautions are advised, whenever the circumstances permit of their adoption:—(i) Avoid all large cloud masses from which showers of rain, hail or snow are falling, especially when meteorological reports give indications of thundery weather—hail is always to be regarded as dangerous. (ii) When wireless is being used in the aircraft, an increase

in the number and strength of atmospheric conditions will generally indicate that a dangerous area is being approached. When the wireless apparatus is being operated by a wireless operator, he should inform the pilot of such an increase. The pilot should consider this information in conjunction with the weather conditions which he can see ahead of him, in deciding whether conditions are actually dangerous. Should the aircraft already be in a dangerous area, e.g., a hail storm, winding in the aerial may be dangerous to the W/T operator. In such a case the aerial should merely be earthed and the aircraft flown out of the storm as quickly as possible; if necessary, the aircraft should be flown back on its course to give the operator an opportunity to wind in the trailing aerial before proceeding through the storm. It is also recommended that the connection of the aerial to earth should be made to the aircraft structure *outside the fuselage*. Whenever possible, the aircraft should be flown well below the lowest layer of any cloud masses encountered.

BRIEFLY

BRITISH AVIATION CORPORATION, which was recently established for the purpose of owning and operating airports and air lines and for general development of aviation communications, has its offices at Windsor House, Victoria Street, London, S. W. 1. (Telephone: Victoria 0816.)

IMPERIAL AIRWAYS speak highly of the value of the Marconi-Robinson Homing device, which was described in FLIGHT for May 18, 1933. This device, to a certain extent, removes the necessity for the erection of radio beacons, and has the great advantage that the standard wireless set, as used in aeroplanes for communication purposes, can also be used for direction finding. It, therefore, eliminates the need for carrying extra instruments. Considerable use was made of this device during the flight to Australia in the *Arethusa*, a machine of the "Atalanta" class, which Maj. H. G. Brackley and Mr. A. R. Prendergast made earlier this year.

"ACHIEVEMENTS OF 1933" is a booklet which can be obtained free of charge from C. C. Wakefield & Co., Ltd., Wakefield House, Cheapside, E.C.2, by our readers who write mentioning FLIGHT. In it they will find a pictorial account of many of the record achievements in the air, on the land, and on the water, during the past year. It deals not only with British efforts but also describes many foreign ones. It is a most striking publication and one which will appeal to young men of all ages.

MR. TRAVERS GRIFFIN has resigned from the directorate board of Luxury Air Tours, Ltd.

HERR WOLF HIRTH, who runs a glider school at Hornberg in Germany, makes his pupils trust the "Grunau Baby" sailplane by performing several loops before completing their training. Miss Joan Meakin, a member of the London Gliding Club, has just completed the course including three loops.

TITANINE EMailite, LTD., of Hendon, inform us they have recently secured the contract for the Air Ministry's doping materials.

THE IRVING AIR CHUTE OF GT. BRITAIN, LTD. announce that they have appointed Brian Lewis & Co. Ltd., 30, Conduit Street, London, W.1, and Heston Air Park, as their sole selling agents for Irvin parachutes in Great Britain and Northern Ireland.

THE PEARSON & PICKERING aeroplane referred to in FLIGHT for September 7, wherein the rotary or "oyster" ailerons are used both for lateral and yawing control, is now in the hangar at Hanworth Park awaiting flying tests.

PHILIPS INDUSTRIAL, 145, Charing Cross Road, W.C.2, inform us that they were responsible for the broadcasting equipment of No. 2 tour of Sir Alan Cobham's circus and also fitted and supplied two publicity vans.

A SPARTAN "CRUISER" (3 Hermes IV) has just been shipped to India for the Maharajah of Patiala.

THERE is so little noise in the Handley Page 42 that a sound intensity of as low as 73 decibels is recorded in the cabin of the A.R.C. report No. 1542.

THE DUCHESS OF BEDFORD—piloted by Flt. Lt. J. B. Allen—and Mr. G. Andrée will be flying to the "Oases Meeting" at Cairo in "Monospars" (2 Pobjoes).

The M.G. "Mille Miglia"

FEW people can have read of the magnificent success of the M.G. "Magnettes" in the *Mille Miglia* early this year without getting a thrill. Now they can live that thrill over again by writing to the M.G. Car Co., Ltd., Abingdon-on-Thames, mentioning FLIGHT, and asking for a copy of the booklet which has just been produced describing that King of Road Races. It will fire them with patriotism, it will make them realise more than ever that it is the men like the magnificent drivers of those little "Magnettes" who lay the foundation stones upon which our trade supremacy is built up all over the world.

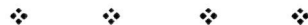
"Night Flight"

SHOWING at The Empire, Leicester Square, this week, the film "Night Flight" is based on that book of the same name.* The book is written in that extraordinary style which always makes one imagine that the author is trying to copy a futuristic painting in words. There is a lot about flying in it, but when you have read it, it leaves you wondering why it was written and what it was all about. From an aviation point of view it is crude and of little value, telling you little or nothing except the view which a neurotic armchair critic might have of any

* "Night Flight," by A. de Saint-Exupéry. Desmond Harmsworth, Ltd. Price 6s. 6d. post free. Obtainable from FLIGHT Office.

job which entails covering new ground with attendant danger. Most of the impressions seem false, and as a description of running an airline it puts altogether too much stress on the powers of a martinet who seems to have no insight into human nature at all.

The film for some extraordinary reason is cast with what the placards call a "galaxy of stars." We can only feel that stars must be very hard up if they are content to play such small parts as this film gives the majority of them. From a photographic and flying point of view it is, however, excellent. Seldom have we seen such admirable shots taken from the air. The story is merely a new way of serving up the old battle of business efficiency *versus* sentiment, and little good seems to be achieved by depicting once again on the screen the pathetic hindrance a wife is who is constantly trying to make a man give up his job because it is dangerous. It deals with the growth of the air mail running by night throughout South America to catch the European mail boat, and its treatment is spectacular enough to satisfy anyone, but we cannot help thinking that the present generation is getting a bit fed up with the men-must-fly-and-the-women-must-weep sort of theme. In the book the mail itself was sufficient justification for running a service at all costs, but the screen version has introduced a sop to sentiment by including a package of serum with which to save the life of a child in a distant hospital.



PUBLICATIONS RECEIVED

The Romance of the Flying Mail. A Pageant of Aerial Progress. By Harper and R. Brenard. London: George Routledge and Sons, Ltd. Price 10s. 6d. net.

Aeronautical Research Committee Reports and Memoranda: No. 1543. *Wind Tunnel Tests on Aerofoils R.A.F. 38 and 48.* By K. W. Clark and W. E. Wood. May, 1933. Price 6d. net. No. 1544. *Interference of a Wind Tunnel on a Symmetrical Body.* By H. Glauert. May, 1933. Price 6d. net. No. 1548. *Influence of Wing Elasticity upon Longitudinal Stability.* By A. G. Pugsley. January, 1933. Price 9d. net. No. 1549. *Fuel Volatility and Carburettor Freezing.* By W. C. Clothier. February, 1933. Price 9d. net. No. 1550. *Reports and Memoranda Published between April 1, 1932, and September 1, 1933.* September, 1933. Price 6d. net. No. 1555. *Effect of Ailerons on Spinning of Bristol Fighter.* By A. V. Stephens. June, 1933. Price 6d. net. London: H.M. Stationery Office, W.C.2.

U.S. National Advisory Committee for Aeronautics Reports: No. 456. *The Aerodynamic Forces and Moments Exerted on a Spinning Model of the "NY-1" Airplane as Measured by the Spinning Balance.* By M. J. Bame and C. H. Zimmerman. Price 5 cents. No. 457. *Maneuverability Investigation of an "03U-1" Observation Airplane.* By F. L. Thompson and H. W. Kirschbaum. Price 5 cents. No. 458. *Relative Loading on Biplane Wings.* By W. S. Diehl. Price 10 cents. No. 459. *The N.A.C.A. Full-Scale Wind Tunnel.* By S. J. De France. Price 5 cents. No. 461. *Interference on an airfoil of Finite Span in an Open Rectangular Wind Tunnel.* By T. Theodorsen. Price 5 cents. No. 465. *Determination of the Theoretical Pressure Distribution for Twenty Airfoils.* By I. E. Garrick. Price 5 cents. No. 468. *The Interference between Struts in Various Combinations.* By D. Biemann and W. H. Herrnstien, Jr. Price 5 cents. No. 469. *Increasing the Air Charge and Scavenging the Clearance Volume of a Compression-Ignition Engine.* By J. A. Spanogle, C. W. Hicks and H. H. Foster. Price 5 cents. No. 471. *Performance of a Fuel-Injection Spark-Ignition Engine Using a Hydrogenated Safety Fuel.* By O. W. Schey and A. W. Young. Price 5 cents. Superintendent of Documents, Washington, D.C., U.S.A.



NEW COMPANIES REGISTERED

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Married.

THOMPSON: THOMPSON.—On November 1, 1933, at St. Helen's Church, Eserick, Yorks, Squadron Leader Ivo Wilfrid Home Thompson, Auxiliary Air Force, only son of Sir Wilfrid and Lady Thompson, of Old Nunthorpe, York, to Miss Sybil Marguerite Thompson, younger daughter of Mr. and Mrs. C. W. Thompson, of The Red House, Eserick.

To be Married.

CAREY: BOND.—The engagement is announced between ALBAN MAJENDIE CAREY, R.A.F., eldest son of Mr. and Mrs. H. N. Carey, of Westgate, Norfolk, and ENID MORTEN, only daughter of Mr. and Mrs. Morten Bond, Castle House, Horsell.

CHERRY: RANKIN.—The engagement is announced between JOHN, younger son of the late Sir Benjamin Cherry, of Lincoln's Inn, and CORISE HELEN MARGARET, elder daughter of Mr. Robert Rankin, M.P., of Broughton Tower, Broughton-in-Furness.

Birth.

STILWELL.—On October 29, 1933, at Langland, Connah's Quay, Flint, to FREDA, the wife of Squadron-Leader C. H. Stilwell—a daughter (GILLIAN).

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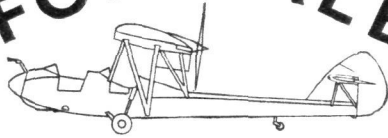
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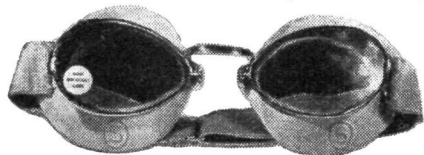
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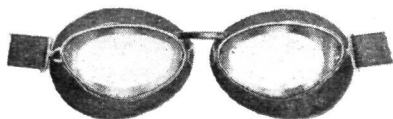
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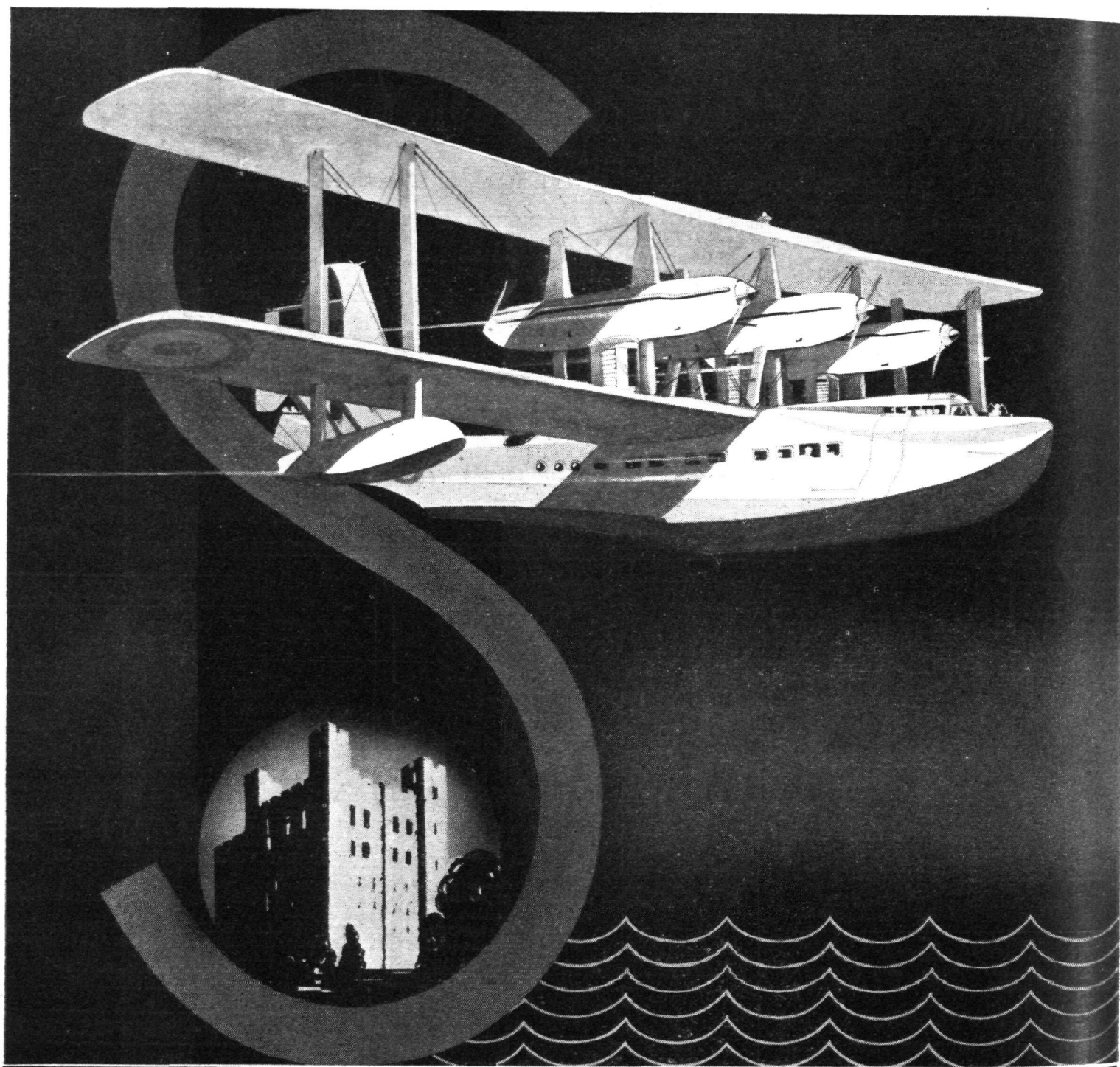
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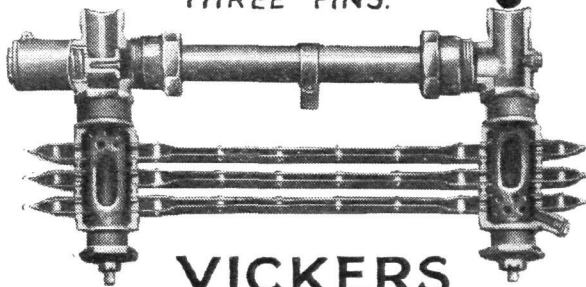
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DATA**

Total laden weight: 8150 lbs.
Number of units in
the undercarriage... 2.
Vertical landing } 10 ft.
velocity of machine } per sec.

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Overall length... 21.75"
Diameter of ram... 3.0"
Maximum travel
or stroke of ram... 4.75"
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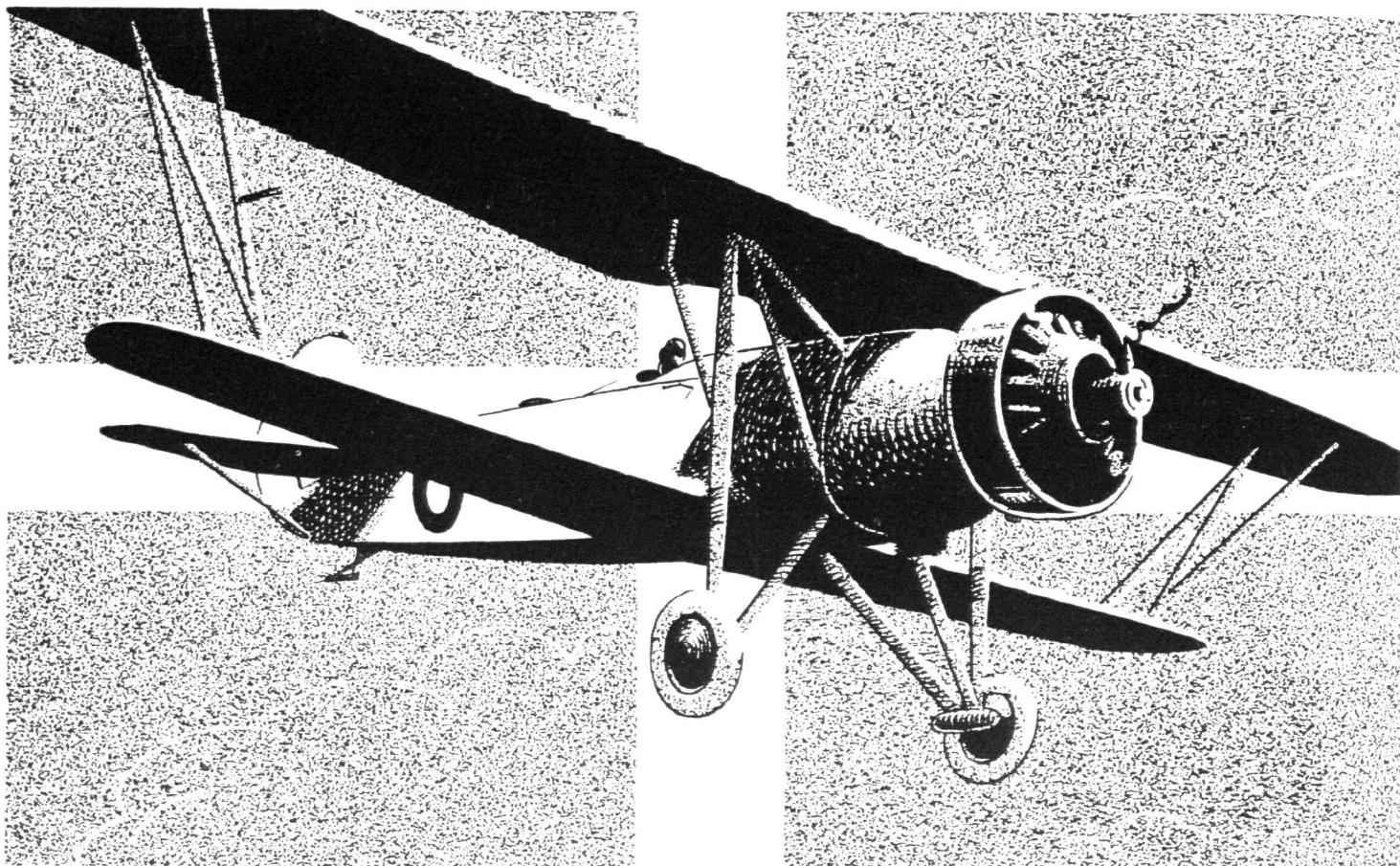
- (a) Total weight of aircraft, fully loaded.
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